
PACIFIC COAST

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The maritime history of the section of the country including the 3 states bordering on the Pacific ocean, and the territory of Alaska, covers a much shorter period than that of the sections bordering on the Atlantic ocean, the Gulf of Mexico, and the Great Lakes. California did not become a state until 1850; Oregon was admitted in 1859, and Washington in 1889; and the territory of Alaska was formally organized in 1884.

The peculiar conditions pertaining to an industry in which vessels ply at regular or irregular intervals between the ports of the several states, or between those ports and other parts of the world, render it impossible to definitely assign these craft, the income from their operation, the freight, wages, etc., to any particular state. This section of the report, therefore, will present the details of transportation by water for the Pacific coast as a whole, together with certain features as to seaboard, rivers, etc.

The few harbors on the Pacific coast are unexcelled in their natural advantages, and there is probably no harbor in the country, all things considered, the equal of that of San Francisco. Although the true harbors are not numerous, there are roadsteads and many ports that offer safe anchorages under certain conditions.

The navigation laws and suggestions for the advancement of the merchant marine of the country form no part of these statistics, and yet the conditions governing transportation by water on the Pacific coast are of too much importance to be passed without briefly directing attention to the extensive coast line, the great tributary rivers draining the rich inland territory, the great natural wealth of the states in agricultural, forest, and mineral products, and particularly the position of vantage with regard to the vast field of commercial development on the Pacific ocean. Within the last year seven or eight of the few American steamers engaged in trans-Pacific trade have been withdrawn from that service, and when this fact is considered in connection with the tremendous advance of the country as a whole in other directions, more especially in facilities for transportation on land, it does not appear that sufficient advantage has been taken of the opportunities for maritime commerce or a proper appreciation entertained of its necessity in connection with other branches of industry.

The surplus products of the agricultural and manu-

facturing branches of industry are increasing in volume, and if they are not exported, a curtailment of these industries must follow. In order that transportation by water may be made satisfactorily available, however, it seems necessary that the same general principles shall be applied to it as to transportation by land.

In the days of American maritime supremacy, before the Pacific coast was a factor in the country's merchant marine, a great business was carried on in the sail trading plan of sending ships out with cargoes to be sold or exchanged for others, and although the days of these traders have passed, the economy connected with the operation of the sailing vessel will probably always insure for that class of craft a certain character of freight. The conditions at present governing commercial intercourse, however, demand the opportunity for the purchase and sale of merchandise, or the renewal of depleted stocks, at frequent intervals, for which reason the steamer must displace the sailing vessel wherever such conditions exist and trade is to be retained. Business conditions, therefore, seem to make necessary for the Pacific coast, regular sailings at as frequent intervals as trade conditions will permit, and by steamers of the highest speed that can be made a source of profitable investment as a commercial enterprise.

GENERAL ANALYSIS.

Before presenting these statistics it should be explained that the freight carried by the merchant marine for the censuses of 1906 and 1889 has been reported by the ton of 2,000 pounds, which is not wholly satisfactory for all purposes of comparison, since it permits of little discrimination between the transportation of a ton of sand or stone and a ton of the most valuable commodity. It is impossible to obtain a true per ton basis of the relative importance of the various commodities carried, because, in addition to the fact that neither the value of the freight nor the number of miles it was carried could be secured, the income was obtainable only as a total for all commodities. It is also impracticable to distinguish the vessels costing little to build and operate from those of the other extreme by the number of tons of cargo carried.

TRANSPORTATION BY WATER.

TABLE 1.—ALL VESSELS AND CRAFT: 1906 AND 1889.¹

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 252 vessels, with a gross tonnage of 28,229, reported as idle in 1906, and 123, with a gross tonnage of 12,067, reported as idle, untraceable, or lost prior to or during 1889.]

	TOTAL.			STEAM. ²			SAIL. ³			UNRIGGED.		
	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels.....	2,537	1,635	55.2	1,066	465	129.2	666	681	+2.2	805	489	64.6
Gross tonnage.....	977,687	419,157	133.3	518,107	160,293	223.2	305,283	195,508	56.1	154,297	63,356	143.5
Value of vessels.....	\$76,622,633	\$21,824,040	251.1	\$60,440,145	\$14,767,355	309.3	\$11,533,171	\$6,231,340	85.1	\$4,640,317	\$825,345	463.3
Gross income.....	\$48,520,139	\$19,872,738	144.2	\$40,220,388	\$12,959,914	210.3	\$8,299,751	\$6,012,824	20.1	(⁴)	(⁴)	.....
Number of employees.....	20,142	11,315	78.0	15,061	6,682	134.4	4,481	4,633	+3.3	(⁴)	(⁴)	.....
Wages.....	\$12,950,399	\$5,880,421	120.2	\$10,230,828	\$3,567,226	186.8	\$2,719,671	\$2,313,195	17.6	(⁴)	(⁴)	.....
Number of passengers carried.....	44,189,971	15,672,093	182.0	44,187,184	15,672,093	181.9	2,787			(⁴)	(⁴)	.....
Freight carried, including harbor work (net tons) ⁵	17,622,816	11,249,927	56.6	14,173,599	8,488,101	67.0	3,449,217	2,761,826	24.9	(⁴)	(⁴)	.....

¹ The 1906 totals include all vessels operating chiefly on the Pacific coast, but the 1889 totals do not include 10 steamers and 86 sailing vessels registered in Atlantic coast ports, but engaged wholly or partially in business on the Pacific coast.

² Includes all craft propelled by machinery.

³ Includes schooner barges, scow schooners, etc.

⁴ Decrease.

⁵ Included in statistics for steam vessels.

⁶ Logs towed in rafts were not reported as freight in 1906; in 1889 an attempt was made to include such freight, but to what extent is uncertain. Harbor work in 1906 amounted to 4,321,523 tons, of which 4,309,678 tons were reported for steam and unriggered vessels, and 11,845 for sail vessels; in 1889 it amounted to 2,431,564 tons, all of which was reported for railroad ferryboats.

The number of vessels increased considerably between 1889 and 1906, but the percentage of gain in number is not one-half that for tonnage, which fact indicates an increase in the size of the vessels in 1906. The largest increase in number of vessels was for steam craft, which gained 601, or 129.2 per cent; the number of unriggered craft increased 316, or 64.6 per cent; while sailing vessels actually decreased 15, or 2.2 per cent. The increase in tonnage was as follows: Steam, 357,814 tons, or 223.2 per cent; sail, 109,775 tons, or 56.1 per cent; and unriggered, 90,941 tons, or 143.5 per cent.

An estimate placed upon the valuation of a vessel is so dependent upon extraneous conditions, which are in a sense apart from the vessel, that it was practically impossible to fix upon any uniform measure which would insure that all would be reported on the same basis. Valuation, therefore, by itself and as compared with tonnage must always be to some extent misleading, since, for instance, the owner of an old vessel engaged in a profitable business would value her much higher than he would a similar vessel that made but few sailings and those of an unprofitable character. Of the three leading features, however, which may be said to describe the fleet, that of value shows the largest percentage of gain, the actual increase amounting to \$54,798,593, or 251.1 per cent. Of this increase, \$45,672,790, or 83.3 per cent, was for steam vessels; \$5,301,831, or 9.7 per cent, was for sailing vessels; and \$3,823,972, or 7 per cent, was for unriggered craft.

The number of employees does not show an increase proportionate to the increase in wages. This may be due to a difference in the methods of securing statistics at the two censuses, since in 1889 the schedule was somewhat different from that used in 1906. The instructions for the latter census provide that the board of crews should be included with the wages, but there is no certainty that such was the case in 1889,

and this fact alone would account for some part of the disproportionate increase of wages over the number of employees. It must not be overlooked, however, that many of the vessels were in operation only a part of the year, and while a crew of the same size would be necessary whether for a month or a year, the total wages paid might be for a period of several weeks or for twelve months; hence the figures presented would not furnish a fair basis for a computation to show average annual earnings.

The gross income increased \$28,647,401, or 144.2 per cent, \$27,260,474, or 95.2 per cent of which was earned by steam and unriggered vessels, and \$1,386,927, or 4.8 per cent, by sailing craft. The income reported by steam craft was considerably augmented by the addition thereto of the income for unriggered vessels. This combination of data was frequently unavoidable, as no separate report of income was obtainable for barges and other unriggered craft which were towed by tugs of the same ownership. In such cases, therefore, although the freight carried on the barges was credited to the unriggered craft, the income was reported for the towing vessels.

The number of passengers carried shows the large increase of 28,517,878, or 182 per cent. All but 2,787 of these passengers were carried on steam vessels.

The amount of freight carried, exclusive of harbor work, shows a gain of 4,482,930 tons, or 50.8 per cent. Of the increase, 3,807,384 tons, or 84.9 per cent, was credited to the steam and unriggered vessels, and 675,546 tons, or 15.1 per cent, to the sailing vessels. Of the total freight, 9,863,921 tons, or 74.2 per cent, was carried by steam and unriggered vessels, and 3,437,372 tons, or 25.8 per cent, by sailing vessels in 1906, as compared with 6,056,537 tons, representing 68.7 per cent, and 2,761,826 tons, or 31.3 per cent, for the two classes of vessels, respectively, in 1889. The conclusions as to freight, however, in this comparative table

are misleading, because the freight carried by unrigged vessels has been included with that for steamers, in order to make these items comparable with the figures for 1889, at which census freight for unrigged craft was not reported separately in full.

In 1906 the freight carried by steamers and unrigged vessels was reported separately and, exclusive of freight classed as harbor work, was as follows: Steamers, 6,685,007 tons, or 50.3 per cent; unrigged craft, 3,178,914 tons, or 23.9 per cent.

TABLE 2.—ALL VESSELS AND CRAFT, BY OCCUPATION, AND PER CENT IN EACH GROUP: 1906.

OCCUPATION.	VESSELS.		TONNAGE.		VALUE OF VESSELS.		GROSS INCOME.		EMPLOYEES.		WAGES.	
	Num-ber.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Num-ber.	Per cent.	Amount.	Per cent.
Total.....	2,537	100.0	977,687	100.0	\$76,622,633	100.0	\$48,520,139	100.0	20,142	100.0	\$12,950,399	100.0
Commercial vessels.....	2,316	91.3	972,687	99.5	75,759,329	98.9	48,417,140	99.8	19,924	98.9	12,821,952	99.0
Freight and passenger.....	1,151	45.4	754,068	77.1	63,440,563	82.8	37,969,854	78.3	16,379	81.3	9,964,556	76.9
Ferryboats.....	47	1.9	40,171	4.1	4,315,522	5.6	4,208,430	8.7	759	3.8	708,777	5.5
Tugs and other towing vessels.....	313	12.3	24,151	2.5	3,353,927	4.4	3,305,938	6.8	1,548	7.7	1,248,085	9.6
Unrigged craft.....	805	31.7	154,297	15.8	4,049,317	6.1	12,932,918	6.0	11,238	6.1	1,900,534	7.0
Yachts.....	170	6.7	2,524	0.3	468,910	0.6	2,600	(2)	94	0.5	45,161	0.3
All other.....	51	2.0	2,476	0.3	394,394	0.5	100,399	0.2	124	0.6	83,286	0.6

¹ In many cases the income, employees, and wages for unrigged craft were not reported separately, but were included in the reports for towing vessels.
² Less than one-tenth of 1 per cent.

Of the Pacific coast fleet, the vessels used for commercial purposes formed 91.3 per cent of the total number, and their tonnage formed 99.5 per cent of the total tonnage. Although these percentages really represent the vessels engaged in the freight and passenger service, a further segregation has been made, which presents statistics for vessels of the several specific types or classes. Those classed as freight and passenger are in every respect the most important, representing over three-fourths of the total tonnage, value, income, wage-earners, and wages reported for all vessels. Most of the business of the freight and passenger class is the transportation of freight. In fact, these and the unrigged craft are credited with practically the whole of the freight tonnage. The unrigged craft represented almost one-third of the total number of vessels reported, but their proportions of the other items shown in Table 2 are much smaller. In this connection it is proper to state that while the unrigged craft have always been credited with the full amount of freight they carried, in many instances the income, number of employees, and wages have been credited to the towing steamers when both were of the same ownership. Tugs and towing vessels are a special type, but they are so closely related and so essential to the freight and passenger and the unrigged vessels, that they are looked upon as a part of those fleets, and it is unsatisfactory to consider separately several of the items connected with their statistics. The tugboats represented but 2.5 per cent of the total

tonnage, this being the smallest proportion for any of the four classes of commercial vessels. Ferryboats are a distinct class, largely engaged in the transportation of passengers, although the ferryboats owned by railroad companies also convey cars as a part of their service. The 47 vessels of this class, while forming but 1.9 per cent of the number of all classes and 4.1 per cent of the tonnage, reported 8.7 per cent of the total income. The 170 yachts formed 6.7 per cent of the total number of all vessels, but for none of the other items contained in the table did their proportion reach 1 per cent. The "all other," or miscellaneous, vessels embraced dredges, pilot boats, water boats, craft used for scientific purposes, and various other vessels not specifically covered by the other classifications.

Steam craft represented more than two-fifths of the number, over one-half of the tonnage, and more than three-fourths of the value of all vessels. The freight and passenger class represented more than one-half of the number of all steam vessels, and almost seven-eighths of the tonnage and value of such vessels. Tugs and other towing vessels are usually of small tonnage; hence, while the number of these vessels formed almost three-tenths of the total number of the steam craft, they constituted less than one-twentieth of their tonnage. These conditions are reversed in the case of ferryboats, although the difference in the proportions is not so great. Yachts and all other craft were comparatively unimportant as to tonnage and value.

TRANSPORTATION BY WATER.

TABLE 3.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND OCCUPATION: 1906.

CLASS AND OCCUPATION.	VESSELS.			TONNAGE.			VALUE OF VESSELS.		
	Number.	Per cent of total.	Per cent of class.	Gross tons.	Per cent of total.	Per cent of class.	Amount.	Per cent of total.	Per cent of class.
Total.....	2,537	100.0	.....	977,687	100.0	.....	\$76,622,633	100.0	.....
Steam.....	1,066	42.0	100.0	518,107	53.0	100.0	60,440,145	78.9	100.0
Freight and passenger.....	604	23.8	56.7	451,270	46.2	87.1	52,164,977	68.1	86.3
Tugs and other towing vessels.....	313	12.3	29.4	24,151	2.5	4.7	3,353,927	4.4	5.5
Ferryboats.....	47	1.9	4.4	40,171	4.1	7.8	4,315,522	5.6	7.1
Yachts.....	66	2.6	6.2	1,065	0.1	0.2	294,800	0.4	0.5
All other.....	36	1.4	3.4	1,450	0.1	0.3	310,919	0.4	0.5
Sail.....	666	26.3	100.0	305,233	31.2	100.0	11,533,171	15.1	100.0
Freight and passenger.....	547	21.6	82.1	302,798	31.0	99.2	11,275,586	14.7	97.8
Yachts.....	104	4.1	15.6	1,450	0.1	0.5	174,110	0.2	1.5
All other.....	15	0.6	2.3	1,026	0.1	0.3	83,475	0.1	0.7
Unrigged.....	805	31.7	100.0	154,297	15.8	100.0	4,649,317	6.1	100.0

¹ Includes 9 schooner barges of 9,077 tons.

In connection with these statistics the following statement, shown by Lloyd's Register, 1907-8, is of interest, since it gives the number and tonnage of such steamers on the Pacific coast, in 1889 and in 1906, of American registry, which had a sustained speed of twelve knots and over:

SUSTAINED SPEED.	NUMBER.			GROSS TONNAGE.		
	Total.	1906	1889	Total.	1906	1889
Total.....	48	31	17	208,298	163,706	44,592
18 knots.....	2	2	.....	22,560	22,560	.....
17 knots.....	5	5	.....	24,320	24,320	.....
16 knots.....	4	2	2	33,594	27,278	6,316
15½ knots.....	3	3	.....	7,382	7,382	.....
15 knots.....	3	1	2	5,865	824	5,041
14½ knots.....	4	2	2	27,327	22,333	4,994
14 knots.....	8	4	4	23,264	8,880	14,404
13½ knots.....	1	.....	1	1,264	.....	1,264
13 knots.....	5	3	2	23,185	17,433	5,752
12½ knots.....	5	2	3	7,730	3,471	4,259
12 knots.....	8	7	1	31,807	20,245	2,562

There was a gain of 14, or 82.4 per cent, in the number of these vessels and 119,114, or 267.1 per cent, in their tonnage. It is a noticeable fact that in but three of the eleven classes were there more vessels in 1889 than in 1906, and in the two classes of greatest speed, 17 and 18 knots, there were none in 1889, while 7 are shown for 1906.

The following list further describes these vessels, and it is significant of their importance to state that 3 of those named, the *Minnesota*, *Manchuria*, and *Mongolia* are the largest vessels of the merchant marine of this country:

List of steamers on the Pacific coast having a sustained speed of 12 knots and over.

NAME.	Sustained speed.	When built.	Gross tonnage.
Korea.....	18 knots.....	1901	11,276
Siberia.....	18 knots.....	1901	11,284
China.....	17 knots.....	1889	5,060
Indianapolis.....	17 knots.....	1904	765
Sierra.....	17 knots.....	1900	5,989
Sonoma.....	17 knots.....	1900	6,253
Ventura.....	17 knots.....	1900	6,253
Alameda.....	16 knots.....	1883	3,158
Manchuria.....	16 knots.....	1903	13,639
Mariposa.....	16 knots.....	1883	3,158
Mongolia.....	16 knots.....	1904	13,639
Chippewa.....	15½ knots.....	1900	996
Iroquois.....	15½ knots.....	1901	1,169
President.....	15½ knots.....	1906	5,217
City of Puebla.....	15 knots.....	1881	2,624
Dolphin.....	15 knots.....	1892	824
Santa Rosa.....	15 knots.....	1884	2,417
Jefferson.....	14½ knots.....	1904	1,615
Minnesota.....	14½ knots.....	1904	20,718
Queen.....	14½ knots.....	1882	2,728
State of California.....	14½ knots.....	1878	2,266
City of Para.....	14 knots.....	1878	3,532
City of Peking.....	14 knots.....	1874	5,080
City of Seattle.....	14 knots.....	1890	1,411
Columbia.....	14 knots.....	1880	2,722
Cottage City.....	14 knots.....	1890	1,885
Peru.....	14 knots.....	1892	3,628
Spokane.....	14 knots.....	1901	2,086
Umatilla.....	14 knots.....	1881	3,070
Pomona.....	13½ knots.....	1888	1,264
City of Sydney.....	13 knots.....	1875	3,017
Nebraskan.....	13 knots.....	1902	4,409
Nevadan.....	13 knots.....	1902	4,409
Newport.....	13 knots.....	1880	2,735
Texas.....	13 knots.....	1902	8,615
City of Topeka.....	12½ knots.....	1884	1,057
Corona.....	12½ knots.....	1888	1,492
George W. Elder.....	12½ knots.....	1874	1,710
Ramona.....	12½ knots.....	1902	1,061
Senator.....	12½ knots.....	1898	2,410
American.....	12 knots.....	1900	5,591
Californian.....	12 knots.....	1900	5,707
Col. E. L. Drake.....	12 knots.....	1903	4,206
Delhi.....	12 knots.....	1906	986
Hawaiian.....	12 knots.....	1901	5,597
Maverick.....	12 knots.....	1890	1,561
Montara.....	12 knots.....	1881	2,562
Oregonian.....	12 knots.....	1901	5,598

The freight vessels of the sailing fleet constituted more than four-fifths of the total number of sailing craft, and were credited with almost all of the tonnage and value of such craft.

The unrigged craft formed nearly one-third of the number of vessels of all classes, about one-sixth of the tonnage, and about one-sixteenth of the value.

Various types of sailing vessels were reported at the census of 1906:

TYPE.	Number of sail vessels.	Gross tonnage.
Total.....	666	305,283
Schooners.....	443	140,156
Barks.....	49	65,546
Ships.....	34	60,681
Barkentines.....	46	35,904
Brigs.....	3	1,101
Sloops.....	73	962
Brigantines.....	2	706
Yawls.....	13	199
Other craft.....	3	28

Of the 666 sailing vessels, 66.5 per cent were schooners, having a tonnage of 45.9 per cent of the total tonnage of sail craft. The schooner is specially adapted to the coastwise trade, because of the deck load capacity not practicable on vessels that are ship-rigged. Schooners have another advantage over ships in that they do not require such large crews and are less expensive to operate. The schooner, however, is not restricted to coastwise business, but is found also in the foreign trade, and there is claimed for the schooner *Solano* a record run, in 1902, from China to Port Townsend in twenty-three days. The first three-masted schooner constructed on the Pacific coast was built in 1875; the first four-masted, in 1886; and the first five-masted, in 1896. There is no record of a schooner of more than five masts having been built on the Pacific coast.

There were 34 ships reported, with a total tonnage of 60,681, or 19.9 per cent of the tonnage of all sailing vessels. This type of vessel seems destined soon to become a thing of the past, as none has been built in the United States during recent years and their usefulness is limited. Of barks and barkentines, there were 95, with a tonnage of 101,450, or 33.2 per cent of the total tonnage for sailing vessels. The remaining 94 sailing vessels, consisting of sloops, yawls, brigs, brigantines, and other craft were unimportant, representing a total of but 2,996 tons, or 1 per cent of the total sail tonnage.

RAILWAY SHIPPING.

A considerable number of vessels were operated as connecting links in railway systems.

TABLE 4.—*Craft operated in connection with steam railroads: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels.....	88	38	50
Gross tonnage.....	51,419	38,188	13,231
Value of vessels.....	\$4,492,003	\$4,259,328	\$233,335
Number of employees.....	788	733	55
Wages.....	\$744,070	\$696,223	\$47,847
Number of passengers carried.....	35,996,163	35,996,163	.....

This fleet was chiefly employed in San Francisco bay. There were 29 ferryboats and 9 towing vessels comprising the steam part of the fleet. The number of passengers carried by these railroad ferries represents 81.5 per cent of the total number of passengers reported by all vessels on the Pacific coast. The unrigged craft embraced car floats, barges, dredges, pile drivers, etc., that were used in connection with the steam vessels and were more or less necessary to their operation.

GOVERNMENT VESSELS.

The vessels owned and operated by states and municipalities are shown in Table 5.

TABLE 5.—*Vessels owned and operated by state and city governments: 1906.*

	Total.	Steam.	Sail.	Unrigged.
Number of vessels.....	31	10	1	20
Gross tonnage.....	3,958	1,463	54	2,471
Value of vessels.....	\$688,728	\$269,000	\$4,000	\$415,728
Gross income.....	\$184,747	\$2,000	.....	\$182,747
Number of employees.....	199	62	4	133
Wages.....	\$160,636	\$62,106	\$190	\$98,340
Number of passengers carried.....	1,156,000	1,156,000	.....	.....

This fleet is composed of 3 boats owned and operated as a free ferry by the city of Portland, Oreg., and a large variety of other vessels, such as dredges, pile drivers, scows, and fire boats. The number of passengers shown in this table are those carried by the free ferry of Portland.

FERRYBOATS.

The full extent of the ferry business upon the Pacific coast as compared with that for the United States for 1889 and 1906 is shown in Table 6.

TRANSPORTATION BY WATER.

TABLE 6.—FERRYBOATS: 1906 AND 1889.

	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME.			Number of employees.	Wages.	Number of passengers carried.
					Total.	Passengers.	All other sources.			
United States.....	1906	536	261,073	\$29,578,380	\$17,291,073	\$10,414,106	\$6,876,967	4,519	\$3,537,180	330,737,639
	1889	456	146,104	10,442,750	(¹)	(¹)	(¹)	(¹)	(¹)	182,033,991
Per cent of increase.....		17.5	78.7	183.2						81.7
Pacific coast.....	1906	47	40,171	4,315,522	4,208,430	2,037,580	2,170,850	759	708,777	39,532,354
	1889	38	24,630	979,300	994,476	(¹)	(¹)	478	395,157	14,291,860
Per cent of increase.....		23.7	63.1	340.7	323.2			58.8	79.4	176.6
Per cent of United States.....	1906	8.8	15.4	14.6	24.3	19.6	31.6	16.8	20.0	12.0
	1889	8.3	16.9	9.4						7.9

¹ Not reported separately.

In 1889 the statistics for ferryboats were not complete in many of the details reported in 1906, hence comparative figures are lacking in several particulars. For such items as were reported at both censuses it is found that, except for gross tonnage, the percentages of increase for the Pacific coast were in excess of those for the United States as a whole. The class of boats added to the fleet since the census of 1889 appears to have been of a large and expensive type, since the increase in number was but 23.7 per cent, while the increase in tonnage was 63.1 per cent, and the increase in valuation was 340.7 per cent. The income shows an increase of \$3,213,954, or 323.2 per cent. In 1906 the income was very evenly divided between the amount received for passenger service and that derived from other sources. Most of the income from all other sources than passengers was that reported by boats operated in connection with railroad ferries and consisted largely of income from loaded and unloaded cars. The freight was classed as lighterage, as the cars were ferried from shore to shore and the freight which they contained was undisturbed in transit. The number of passengers increased 25,240,495, or 176.6 per cent. A comparison of the statistics for the Pacific coast with similar items for the entire country shows the proportions for the Pacific coast to be about as follows: Number of vessels, one-twelfth; tonnage, one-sixth; valuation, one-seventh; gross income, one-fourth; number of employees, one-sixth; wages, one-fifth; and number of passengers, one-eighth. The exact percentages are contained in Table 6.

FISHING CRAFT.

Statistics concerning vessels engaged in the fisheries were taken at the census of 1889, but they were not secured in 1906, because at a later date a special census of the fisheries is to be taken, which will be of a more comprehensive character than would have been prac-

ticable if the fisheries were covered by a general inquiry.

TABLE 7.—Vessels engaged in the commercial fisheries and the persons employed thereon.¹

	Pacific coast, 1904.	Alaska, 1905.
Fishing vessels:		
Number.....	87	3
Tonnage (net).....	7,637	148
Value.....	\$506,400	\$21,000
Value of outfit.....	\$289,897	\$8,000
Transporting vessels:		
Number.....	139	167
Tonnage (net).....	2,745	65,552
Value.....	\$477,600	\$2,735,807
Value of outfit.....	\$68,055	(²)
Persons employed:		
On fishing vessels.....	1,205	
On transporting vessels.....	401	533

¹ Compiled from the reports of the Bureau of Fisheries.² Not reported.

The statistics are somewhat meager and fail to indicate the extent and importance of the fisheries on the Pacific coast. The fisheries for Alaska present an anomaly that might be misleading to those unfamiliar with the prevailing conditions in that section. The extensive fisheries of that territory show but 3 vessels of 148 tons engaged in fishing, although 167 vessels of 65,552 tons were used to transport the fish, supplies, etc. This may be explained by the great extent of the so-called station fishing, which is carried on from shore stations in numerous small boats, and no doubt most of the persons employed in taking fish are station fishermen, whose catch must be transported to canneries or other markets.

OWNERSHIP OF VESSELS.

A comparison of ownership for steam and sail vessels with the statistics for 1889 limits the presentation to but two classes—incorporated companies and all other forms of ownership combined.

TABLE 8.—OWNERSHIP FOR STEAM AND SAIL VESSELS: 1906 AND 1889.

CLASS AND OWNERSHIP.	VESSELS.				TONNAGE.				VALUE OF VESSELS.			
	Number.		Percent of total.		Gross tons.		Percent of total.		Amount.		Percent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889
Total	1,732	1,146	100.0	100.0	823,390	355,801	100.0	100.0	\$71,973,316	\$20,968,695	100.0	100.0
Steam and sail:												
Incorporated company	796	281	46.0	24.5	637,571	164,398	77.4	46.2	61,426,091	12,313,110	85.3	58.6
All other forms of ownership	936	865	54.0	75.5	185,819	191,403	22.6	53.8	10,546,025	8,685,585	14.7	41.4
Steam	1,066	405	100.0	100.0	518,107	160,293	100.0	100.0	60,440,145	14,767,355	100.0	100.0
Incorporated company	609	221	57.1	47.5	477,815	127,498	92.2	79.5	55,560,485	11,575,605	91.9	78.4
All other forms of ownership	457	244	42.9	52.5	40,292	32,795	7.8	20.5	4,879,660	3,191,750	8.1	21.6
Sail	666	681	100.0	100.0	305,283	195,508	100.0	100.0	11,533,171	6,231,340	100.0	100.0
Incorporated company	187	60	28.1	8.8	159,756	36,900	52.3	18.9	5,886,206	737,505	50.9	11.8
All other forms of ownership	479	621	71.9	91.2	145,527	158,608	47.7	81.1	5,666,965	5,493,835	49.1	88.2

The growth and importance of corporate ownership are evident from a comparison of the data relative to the tonnage and the valuation of the two classes of ownership for 1889 and for 1906. The number of vessels of corporate ownership was less than the number of those of all other forms in 1889 and also in 1906, but the percentages were more nearly equal at the later census. The tonnage for corporations represented less than one-half of the total tonnage in 1889 and more than three-fourths in 1906. The value of vessels of corporate ownership increased from less than five-eighths in 1889 to about seven-eighths in 1906. Corporate ownership of the steam fleet, which represented somewhat less than one-half of the number

of vessels in 1889, had increased to more than one-half in 1906; but for tonnage and value this class of ownership had increased to such an extent in 1906 as to make all other forms of ownership of comparative insignificance, the actual proportions in 1906 being 92.2 per cent and 91.9 per cent, respectively.

The number of sailing vessels was less in the "all other" class in 1906 than in 1889, and with a reduced percentage, but corporate ownership claimed slightly more than one-half of the tonnage and value at the later census, notwithstanding the fact that more than 80 per cent of each of these last two items was reported for the "all other" forms of ownership in 1889.

TABLE 9.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND BY CHARACTER OF OWNERSHIP, WITH PER CENT OF TOTAL AND PER CENT OF CLASS: 1906.

CLASS AND OWNERSHIP.	VESSELS.			TONNAGE.			VALUE OF VESSELS.		
	Number.	Per cent of total.	Per cent of class.	Gross tons.	Per cent of total.	Per cent of class.	Amount.	Per cent of total.	Per cent of class.
Total	2,537	100.0	100.0	977,687	100.0	100.0	\$76,622,633	100.0	100.0
Individual	806	31.8	-----	119,565	12.2	-----	6,585,265	8.6	-----
Firm	275	10.8	-----	73,131	7.5	-----	3,678,325	4.8	-----
Incorporated company	1,404	55.3	-----	770,404	78.8	-----	65,235,015	85.1	-----
Miscellaneous	52	2.0	-----	14,587	1.5	-----	1,124,028	1.5	-----
Steam	1,066	42.0	100.0	518,107	53.0	100.0	60,440,145	78.9	100.0
Individual	320	12.6	30.0	23,015	2.4	4.4	2,912,260	3.8	4.8
Firm	121	4.8	11.4	14,084	1.4	2.7	1,599,400	2.1	2.6
Incorporated company	609	24.0	57.1	477,815	48.9	92.2	55,560,485	72.5	91.9
Miscellaneous	16	0.6	1.5	3,193	0.3	0.6	368,000	0.5	0.6
Sail	666	26.3	100.0	305,283	31.2	100.0	11,533,171	15.1	100.0
Individual	366	14.4	55.0	85,227	8.7	27.9	3,455,600	4.5	30.0
Firm	99	3.9	14.9	51,721	5.3	16.9	1,934,565	2.5	16.8
Incorporated company	187	7.4	28.1	159,756	16.3	52.3	5,886,206	7.7	50.9
Miscellaneous	14	0.6	2.1	8,579	0.9	2.8	276,800	0.4	2.4
Unrigged	805	31.7	100.0	154,297	15.8	100.0	4,649,317	6.1	100.0
Individual	120	4.7	14.9	11,323	1.2	7.3	217,405	0.3	4.7
Firm	55	2.2	6.8	7,326	0.7	4.7	144,360	0.2	3.1
Incorporated company	608	24.0	75.5	132,833	13.6	86.1	3,808,324	5.0	81.9
Miscellaneous	22	0.9	2.7	2,815	0.3	1.8	479,228	0.6	10.3

Corporate ownership controlled over one-half of the total number, over three-fourths of the tonnage, and about seven-eighths of the value of all the vessels of the Pacific coast. Individual ownership was second in importance, with about one-third of the number of

vessels, almost one-eighth of the tonnage, and more than one-twelfth of the value. Firms represented about one-tenth of the number, and were credited with even smaller proportions of the tonnage and the value. Those vessels which could not properly be placed with

any of the three classes named have been grouped as of miscellaneous ownership. They are unimportant, forming but 2 per cent of the total number and 1.5 per cent of the tonnage and value.

Over one-half of the steam craft, with more than nine-tenths of the tonnage and the value of all steam vessels, were controlled by corporations. The importance of this form of ownership is further illustrated by the fact that such ownership of steamers represented about one-half of the tonnage of all classes of vessels on the Pacific coast and about three-fourths of their total value. In fact, corporate ownership predominated also in sail and unrigged vessels, with the single exception that the number of sail vessels of individual ownership was nearly double that of corporate ownership. Of the three main groups of ownership, that of firms was the least important, when considered as to its totals for all classes of ownership and also for each of the three classes of vessels.

NUMBER AND TONNAGE OF VESSELS.

Of the total number of vessels, 42 per cent was steam, 26.3 per cent was sail, and 31.7 per cent was unrigged. The tonnage of these three classes of vessels formed 53 per cent, 31.2 per cent, and 15.8 per cent, respectively, of the total tonnage.

TABLE 10.—*Vessels grouped according to gross tonnage: 1906.*

TONNAGE.	Total.	Steam.	Sail.	Unrigged.
Total:				
Number of vessels.....	2,537	1,066	666	805
Gross tonnage.....	977,687	518,107	305,283	154,297
5 to 49 tons:				
Number of vessels.....	976	459	257	260
Gross tonnage.....	18,809	7,400	6,151	5,258
50 to 99 tons:				
Number of vessels.....	320	104	52	164
Gross tonnage.....	22,546	7,862	3,751	10,933
100 to 199 tons:				
Number of vessels.....	283	116	18	149
Gross tonnage.....	40,050	17,459	2,662	19,929
200 to 299 tons:				
Number of vessels.....	155	62	24	69
Gross tonnage.....	37,561	15,121	6,298	16,172
300 to 399 tons:				
Number of vessels.....	118	60	30	28
Gross tonnage.....	40,612	20,512	10,429	9,671
400 to 499 tons:				
Number of vessels.....	98	50	30	18
Gross tonnage.....	44,079	22,324	13,804	7,951
500 to 999 tons:				
Number of vessels.....	361	105	156	100
Gross tonnage.....	243,497	71,257	108,095	64,145
1,000 to 2,499 tons:				
Number of vessels.....	177	62	98	17
Gross tonnage.....	271,166	99,677	151,251	20,238
2,500 to 4,999 tons:				
Number of vessels.....	34	33	1	.....
Gross tonnage.....	109,680	106,838	2,842	.....
5,000 tons and over:				
Number of vessels.....	15	15	.....	.....
Gross tonnage.....	149,657	149,657	.....	.....

The vessels of from 5 to 999 tons numbered 2,311 and had a total tonnage of 447,184, representing 91.1 per cent of the number and 45.7 per cent of the tonnage of all the vessels of the Pacific coast. The vessels of from 1,000 tons or more numbered but 226, with a tonnage, however, of 530,503, representing, therefore, only 8.9 per cent of the total number and 54.3 per cent of the total tonnage.

Although the largest number of vessels, 976, in any one group is in the group with craft having a tonnage of from 5 to 49, their total tonnage is the smallest. The largest tonnage is found in the class 1,000 tons to 2,499 tons, with a total of 177 vessels and 271,166 tons, the largest proportion of this tonnage, 55.8 per cent, being for sailing vessels. It is a noticeable fact that this group practically ends the sailing craft, as but one sail vessel is found in the next larger class and none in the class which follows. Thus it seems safe to say that the useful limit of the sailing vessel on the Pacific coast is less than 2,500 tons.

Steam craft are of much larger tonnage than sailing or unrigged vessels, the size of the steam vessels being limited only by the ability to enter ports and to be handled profitably. There were but 15 vessels (steamers) of over 5,000 tons each, but they represented a total of 149,657 tons, or 15.3 per cent of the tonnage of all vessels on the Pacific coast.

The second largest number of vessels is found in the class 500 tons to 999 tons, and shows a fairly even distribution of vessels into steam, sail, and unrigged, both as to numbers and tonnage. In this class the unrigged vessels show their largest tonnage, 64,145, or 41.6 per cent of the total tonnage of the unrigged craft. Of the total number of vessels, more than one-half, 1,296, or 51.1 per cent, was of less than 100 tons each, although their total tonnage formed but 4.2 per cent of the total for all vessels.

CONSTRUCTION AND VALUATION.

The character of construction forms an interesting and instructive feature of these statistics, and is presented in connection with the reported valuation. Of the figures for valuation, however, it seems necessary to say again that there are so many and such conflicting elements associated with the determination of this fact that the results are unsatisfactory; they are presented, however, subject to the limitations referred to on the subject of valuation which appears in the United States section of this report.

Three kinds of construction are represented in Table 11; inasmuch, however, as composite construction is credited with but 3 vessels in 1906 and only 2 vessels in 1889, this class will be passed without further consideration and the discussion confined to the two important classes. As the statistics in this table do not distinguish between the vessels built of iron and those built of steel, for brevity and convenience this class will be termed "metal" as distinguished from "wood."

In 1906, as in 1889, much the larger number and tonnage were reported for the wooden vessels, although the percentage of tonnage was considerably diminished in 1906. On the other hand, however, the value of metal vessels, which amounted to less than one-half that of wooden vessels in 1889, had assumed the leading position at the census of 1906. The freight and passenger

vessels are responsible for most of this increase in the value of metal construction, this class representing 52.5 per cent of the total value of all vessels on the Pacific coast in 1906, as compared with 29.5 per cent in 1889. The growth of metal construction in freight and pas-

senger vessels is shown by a glance at the increases in this class in number, tonnage, and value. In 1906 the number of such vessels was almost six times as great as in 1889, the tonnage over seven times as great, and the value over six times.

TABLE 11.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND OCCUPATION AND BY CHARACTER OF CONSTRUCTION: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Aggregate.....	1906	2,537	977,687	\$76,622,633	130	354,134	\$41,375,742	2,404	622,606	\$35,168,891	3	947	\$78,000
	1889	1,635	419,157	21,824,040	23	48,121	6,613,065	1,610	369,738	15,100,975	2	1,298	110,000
Steam.....	1906	1,066	518,107	60,440,145	105	318,995	39,702,536	959	198,279	20,664,609	2	833	73,000
	1889	465	100,293	14,767,355	22	47,124	6,573,065	442	112,080	8,094,290	1	1,089	100,000
Freight and passenger.....	1906	604	451,270	52,164,977	86	313,217	38,553,013	517	137,634	13,561,964	1	419	50,000
	1889	354	129,491	12,660,755	17	46,140	6,398,065	336	82,262	6,162,690	1	1,089	100,000
Tugs and other towing vessels.....	1906	313	24,151	3,353,927	14	2,482	623,194	299	21,669	2,730,733			
	1889	70	6,109	1,120,800	4	599	135,000	66	5,540	985,500			
Ferryboats.....	1906	47	40,171	4,315,522	2	2,964	450,000	44	36,793	3,842,522	1	414	23,000
	1889	38	24,630	979,300	1	415	40,000	37	24,215	939,300			
Yachts.....	1906	66	1,065	294,800	1	102	17,000	65	963	277,800			
	1889	3	63	6,500				3	63	6,500			
All other.....	1906	36	1,450	310,919	2	230	59,329	34	1,220	251,590			
	1889												
Sail.....	1906	660	305,283	11,533,171	20	31,848	1,642,206	645	273,321	9,885,965	1	114	5,000
	1889	681	195,508	6,231,340	1	997	40,000	679	194,302	6,181,340	1	209	10,000
Freight and passenger.....	1906	547	302,798	11,275,586	20	31,848	1,642,206	527	270,950	9,633,380			
	1889	647	194,478	6,112,340	1	997	40,000	645	193,272	6,062,340	1	209	10,000
Yachts.....	1906	104	1,459	174,110				104	1,459	174,110			
	1889	25	612	69,300				25	612	69,300			
All other.....	1906	15	1,026	83,475				14	912	78,475	1	114	5,000
	1889	9	418	49,700				9	418	49,700			
Unrigged ¹	1906	805	154,297	4,649,317	5	3,291	31,000	800	151,006	4,018,217			
	1889	489	63,356	823,345				489	63,356	823,345			

¹ The character of construction was not reported in 1889, but for purposes of comparison in this table all vessels are assumed to be of wood.

The feature of increased valuation is conspicuous also in freight and passenger vessels of wooden construction, their value being \$23,195,344, or 30.3 per cent of the value of all vessels, in 1906, as compared with \$12,225,030, or 56 per cent, in 1889. This class of wood construction increased as follows: Number of vessels, 63, or 6.4 per cent; gross tonnage, 133,050, or 48.3 per cent; valuation, \$10,970,314, or 89.7 per cent. Wooden construction can not be passed without directing attention to a class of vessels peculiar to the Pacific coast known as steam schooners. These vessels are of low power, very staunch, and of great carrying capacity. Unlike the steamer in general, they have the characteristic of the sailing schooner, in that they are able to carry large deck loads of lumber. Although some of these vessels have been built in eastern yards, because of their great and immediate demand, they are mostly the creation of Pacific coast yards, where the abundance of timber has stimulated their production. Upward of 100 of these specially constructed steamers are owned in San Francisco for use in the transportation of lumber.

Ferryboats increased largely in valuation between the two censuses, their value being \$4,315,522, or 5.6

per cent of the value of all vessels on that coast in 1906, compared with \$979,300, or 4.5 per cent, in 1889. Wood is still shown to be the favorite material for the construction of this class of boats, as out of a total for both classes of 46 vessels of 39,757 tons in 1906 only 2 of 2,964 tons were of metal construction, while in 1889 there was but one of 415 tons out of a total of 38 of 24,630 tons. In the years from 1889 to 1906 two ferryboats, of 1,631 and 1,333 tons, respectively, were added to the metal fleet, the one boat of this class shown in 1889 not being reported in 1906.

The tugs and other towing vessels were also largely of wood construction at both censuses. Although there has been a considerable increase in metal construction of this class of vessels, it has not been sufficient to cause any marked change in the relative proportion of metal and wood construction. The metal construction represented 4.5 per cent of all vessels of this class, 10.3 per cent of their tonnage, and 18.6 per cent of their value in 1906, as compared with 5.7 per cent, 9.3 per cent, and 12 per cent, respectively, for the three items in 1889.

Unrigged craft were not reported as to character of construction at the census of 1889, and all vessels

TRANSPORTATION BY WATER.

of this class for that year have been assumed to be of wood construction; and as the unrigged vessels of metal construction at the census of 1906 formed but six-tenths of 1 per cent of the total number of unrigged

craft, 2.1 per cent of the total tonnage, and seven-tenths of 1 per cent of the total value, there could have been but slight error in the classification.

TABLE 12.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND BY CHARACTER OF CONSTRUCTION, WITH PER CENT OF TOTAL AND PER CENT OF INCREASE: 1906 AND 1889.

CLASS, AND CHARACTER OF CONSTRUCTION.	VESSELS.					TONNAGE.					VALUE OF VESSELS.				
	Number.		Per cent of total.		Per cent of increase.	Gross tons.		Per cent of total.		Per cent of increase.	Amount.		Per cent of total.		Per cent of increase.
	1906	1889	1906	1889		1906	1889	1906	1889		1906	1889	1906	1889	
Aggregate.....	2,537	1,635	100.0	100.0	55.2	977,687	419,157	100.0	100.0	133.3	\$76,622,633	\$21,824,040	100.0	100.0	251.1
Iron and steel.....	130	23	5.1	1.4	465.2	354,134	48,121	36.2	11.5	635.9	41,375,742	6,613,065	54.0	30.3	525.7
Wood.....	2,404	1,610	94.8	98.5	49.3	622,606	369,738	63.7	88.2	68.4	35,168,891	15,109,975	45.9	69.2	132.9
Composite.....	3	2	0.1	0.1	50.0	947	1,298	0.1	0.3	127.0	78,000	110,000	0.1	0.5	129.1
Steam.....	1,066	465	100.0	100.0	129.2	518,107	160,293	100.0	100.0	223.2	60,440,145	14,767,355	100.0	100.0	309.3
Iron and steel.....	105	22	9.8	4.7	377.3	318,995	47,124	61.6	29.4	576.9	39,702,536	6,573,065	65.7	44.5	504.0
Wood.....	959	442	90.0	95.1	117.0	198,279	112,080	38.3	69.9	76.9	20,664,609	8,094,290	34.2	54.8	155.3
Composite.....	2	1	0.2	0.2	100.0	833	1,089	0.2	0.7	123.5	73,000	100,000	0.1	0.7	127.0
Sail.....	666	681	100.0	100.0	12.2	305,283	195,508	100.0	100.0	56.1	11,533,171	6,231,340	100.0	100.0	85.1
Iron and steel.....	20	1	3.0	0.1	1,900.0	31,848	997	10.4	0.5	3,094.4	1,642,206	40,000	14.2	0.6	4,005.5
Wood.....	645	679	96.8	99.7	15.0	273,321	194,302	89.5	99.4	40.7	9,885,965	6,181,340	85.7	99.2	59.9
Composite.....	1	1	0.2	0.1	.....	114	209	(?)	0.1	145.5	5,000	10,000	(?)	0.2	150.0
Unrigged ¹	805	489	100.0	100.0	64.6	154,297	63,356	100.0	100.0	143.5	4,649,317	825,345	100.0	100.0	463.3
Iron and steel.....	5	.....	0.6	.....	.....	3,291	.....	2.1	.....	.....	31,000	.....	0.7	.....	.....
Wood.....	800	489	99.4	100.0	63.6	151,006	63,356	97.9	100.0	138.3	4,618,317	825,345	99.3	100.0	459.6

¹ Decrease.

² Less than one-tenth of 1 per cent.

³ The character of construction of unrigged craft was not reported in 1889, but for purposes of comparison in this table all were assumed to be of wood.

At the census of 1906, as compared with that of 1889, the actual increase in the number of vessels of metal construction was but 107, while the gain in vessels of wood was 794; the percentages of gain, however, were 465.2 and 49.3, respectively. Although the relative proportion of increase in tonnage is not dissimilar—635.9 per cent for metal construction and 68.4 per cent for wood—the actual gain was 306,013 for metal and 252,868 for wood. In value metal construction showed an actual gain of \$34,762,677, or 525.7 per cent, compared with \$20,067,916, or 132.9 per cent, for wood. Thus it is seen that the increased value of metal construction was nearly as large as the total value of all vessels of wood construction.

The growth of metal construction is further evidenced by a glance at the relative proportions which the number, tonnage, and value of this character of construction held at the two censuses.

Most of this great gain was in steam craft. In fact, so far as new construction is concerned, it may be said to be entirely due to steam-propelled vessels, since practically the entire gain in sailing vessels of metal construction has been caused by the addition of vessels to the fleet in accordance with various acts of Congress.

Table 13 is particularly misleading as connected with the Pacific coast fleet, since vessels built on the Atlantic coast and in other sections of the country were documented in those localities and therefore do not appear in this table, although they belong to the Pacific coast fleet. Among such vessels are the 2 steamers, *Minnesota* and *Dakota*, of over 20,000 gross tons each. These 2 fine steamers, built in an eastern shipyard for the Pacific trade, were documented in New York city.

TABLE 13.—NUMBER AND GROSS TONNAGE OF VESSELS ADDED TO THE DOCUMENTED FLEET EACH YEAR, BY CLASS AND BY CHARACTER OF CONSTRUCTION: 1880 TO 1906.¹

YEAR.	AGGREGATE.								STEAM.							
	Total.		Iron.		Steel.		Wood.		Total.		Iron.		Steel.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	200	22,206	1	1,854	2	893	198	21,313	117	9,746	2	893	115	8,853		
1905	169	25,831	1	1,854	3	2,398	165	21,579	108	12,141	2	184	106	11,957		
1904	180	21,926	1	1,854	4	1,866	176	20,060	118	12,878	4	1,866	114	11,012		
1903	191	48,140	1	2,976	7	11,777	183	33,387	106	24,736	1	2,976	99	11,068		
1902	226	55,704	1	639	3	12,838	222	42,317	98	22,060	1	639	95	10,714		
1901	287	77,859	5	7,187	12	24,050	270	46,622	100	30,281	8	17,348	92	12,933		
1900	314	55,102	4	8,368	5	5,631	305	41,103	84	21,578	1	3,945	79	12,984		
1899	314	56,439	5	14,069	12	3,317	297	39,053	140	39,361	4	12,126	124	23,918		
1898	236	63,339	4	7,030	6	10,551	226	45,758	121	45,373	2	4,805	113	30,017		
1897	66	8,902	1	1,160	2	707	65	7,742	33	3,703	1	1,160	32	2,543		
1896	93	10,818	1	900	2	707	91	10,111	31	4,929	2	707	29	4,222		
1895	76	8,060	1	900	1	2,504	74	4,656	19	5,043	1	2,504	18	2,539		
1894	60	5,499	1	103	1	103	59	5,396	20	3,697	1	103	19	3,594		
1893	91	13,721	1	3,528	1	3,528	90	10,193	28	7,184	1	3,528	27	3,656		
1892	139	20,770	1	400	1	400	138	20,370	49	9,940	1	400	48	9,540		
1891	122	19,070	1	2,755	1	2,293	122	19,070	54	9,167	1	2,755	54	9,167		
1890	95	17,383	1	2,755	2	2,379	93	12,335	58	9,651	2	379	57	6,896		
1889	112	17,939	1	1,081	1	1,081	110	17,560	72	12,747	1	1,081	70	12,368		
1888	105	23,174	1	80	1	80	104	22,093	55	12,710	1	80	54	11,629		
1887	74	9,240	1	828	1	828	73	9,160	33	3,851	1	828	32	3,771		
1886	58	5,914	1	828	1	828	58	5,914	23	3,023	1	828	23	3,023		
1885	77	11,507	1	828	1	828	75	9,317	38	8,868	1	828	36	6,678		
1884	85	10,620	1	828	1	828	85	10,620	42	5,866	1	828	42	5,866		
1883	91	16,738	1	828	1	828	91	16,738	34	4,019	1	828	34	4,019		
1882	76	15,832	1	27	1	27	75	15,805	29	6,782	1	27	28	6,755		
1881	61	11,554	1	27	1	27	61	11,554	21	3,010	1	27	21	3,010		
1880	42	9,940	2	1,412	1	1,412	40	8,528	25	7,643	1	415	24	7,228		

YEAR.	SAIL.								UNRIGGED.	
	Total.		Iron.		Steel.		Wood.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	21	4,424	1	1,854	1	2,214	21	4,424	62	8,030
1905	23	8,528	1	1,854	1	2,214	21	4,460	38	5,162
1904	28	4,586	1	1,854	1	2,214	28	4,586	34	4,462
1903	51	21,552	1	1,854	1	1,085	50	20,467	34	1,852
1902	49	27,816	1	1,854	1	2,131	48	25,685	79	5,918
1901	61	40,048	5	7,187	4	6,702	52	26,159	126	7,530
1900	58	23,317	3	4,423	1	982	54	17,912	172	10,207
1899	45	9,620	1	1,943	1	1,943	44	7,686	129	7,449
1898	50	10,578	2	2,225	1	1,943	48	8,353	65	7,388
1897	33	5,199	1	1,854	1	1,854	33	5,199		
1896	62	5,889	1	1,854	1	1,854	62	5,889		
1895	57	3,017	1	900	1	900	56	2,117		
1894	40	1,802	1	828	1	828	40	1,802		
1893	63	6,537	1	828	1	828	63	6,537		
1892	89	10,615	1	828	1	828	89	10,615	1	215
1891	68	9,903	1	828	1	828	68	9,903		
1890	37	7,732	1	828	1	2,293	36	5,439		
1889	40	5,192	1	828	1	828	40	5,192		
1888	49	10,350	1	828	1	828	49	10,350	1	105
1887	41	5,389	1	828	1	828	41	5,389		
1886	35	2,891	1	828	1	828	35	2,891		
1885	39	2,639	1	828	1	828	39	2,639		
1884	43	4,754	1	828	1	828	43	4,754		
1883	56	11,548	1	828	1	828	56	11,548	1	1,171
1882	47	9,050	1	828	1	828	47	9,050		
1881	38	7,519	1	828	1	828	38	7,519	2	1,025
1880	16	1,934	1	997	1	997	15	937	1	363

¹ Includes all vessels, except yachts, reported by the Commissioner of Navigation as built, admitted to registry by acts of Congress renationalized, and purchased from the United States.

The average number of documented vessels added to the Pacific coast fleet for the twenty-seven years from 1880 to 1906 was 135 and the average tonnage 24,567. The six years from 1898 to 1903 were the most marked in the growth of this fleet, showing an average per year of 261 in number and 59,446 in tonnage. The largest number of vessels added in a single year was 314, reported for both 1899 and 1900, and the smallest number, 42, for 1880. The largest tonnage, 77,859, was added in 1901, and the smallest, 5,499, in 1894. Wood construction shows its largest growth

during the six years from 1898 to 1903 and steel vessels from 1901 to 1903. Of the 22 steel vessels added from 1901 to 1903, 16 were steamers, and their tonnage amounted to 38,747, or 79.6 per cent of the total tonnage of the steel vessels. Wood construction from 1898 to 1903 was represented by 1,503 vessels of 248,240 tons. Six hundred and two, or 40.1 per cent of the number, having a tonnage of 101,634, or 40.9 per cent, were steam vessels; 296, or 19.7 per cent of the number, and 106,262 tons, or 42.8 per cent of the tonnage, were sail vessels; while 605, or 40.3 per cent

TRANSPORTATION BY WATER.

of the number, and 40,344 tons, or 16.3 per cent of the tonnage, were reported for the unrigged craft. There were 28 vessels of 49,739 tonnage of iron construction. Of these, however, 25 of 47,935 tonnage were added to the fleet not by natural growth by being built on the Pacific coast, or in fact in any section of the United States, but by being admitted to American registry by various acts of Congress. The following statement shows the number and tonnage of the several classes of vessels which were added to the documented merchant marine on the Pacific coast by general or special acts of Congress, by being renationalized, or by purchase from the United States:

	TOTAL.		STEAM.		SAIL.		UNRIGGED.	
	Num-ber of ves-sels.	Gross ton-nage.	Num-ber of ves-sels.	Gross ton-nage.	Num-ber of ves-sels.	Gross ton-nage.	Num-ber of ves-sels.	Gross ton-nage.
Total..	80	91,551	37	51,374	40	38,747	3	1,430
Iron.....	25	47,935	11	28,406	14	19,529	.....	.....
Steel.....	16	32,652	7	17,245	9	15,407	.....	.....
Wood.....	39	10,964	19	5,723	17	3,811	3	1,430

The growth in the size of the vessels of the Pacific fleet is indicated by the average tonnage and the average value per vessel and per ton for the censuses of 1906 and 1889.

TABLE 14.—AVERAGE GROSS TONNAGE AND VALUE PER VESSEL AND AVERAGE VALUE PER TON: 1906 AND 1889.

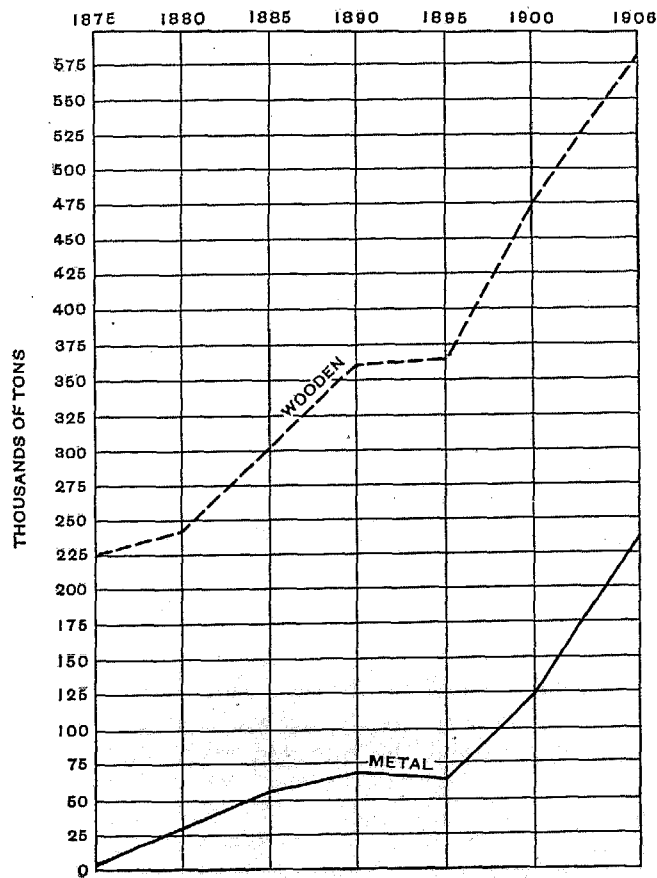
CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD			COMPOSITE.		
		Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.
Aggregate.....	1906	385	\$30,202	\$78	2,724	\$318,275	\$117	259	\$14,629	\$56	316	\$26,000	\$82
	1889	256	13,348	52	2,092	287,525	137	230	9,379	41	649	55,000	85
Steam.....	1906	486	56,698	117	3,038	378,119	124	207	21,548	104	417	36,500	88
	1889	345	31,758	92	2,142	298,776	139	254	18,313	72	1,089	100,000	92
Freight and passenger.....	1906	747	86,366	116	3,642	448,291	123	266	26,232	99	419	50,000	119
	1889	366	35,765	98	2,714	376,357	139	245	18,341	75	1,089	100,000	92
Tugs and other towing vessels...	1906	77	10,715	139	177	44,514	251	72	9,133	126	.....	.....	.....
	1889	87	16,011	183	142	33,750	237	84	14,936	178	.....	.....	.....
Ferryboats.....	1906	855	91,820	107	1,482	225,000	152	836	87,330	104	414	23,000	56
	1889	648	25,771	40	415	40,000	96	654	25,386	39	.....	.....	.....
Yachts.....	1906	16	4,467	277	102	17,000	167	15	4,274	288	.....	.....	.....
	1889	21	2,167	103	.....	.....	.....	21	2,167	103	.....	.....	.....
All other.....	1906	40	8,637	214	115	29,665	258	36	7,400	206	.....	.....	.....
	1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sail.....	1906	458	17,317	38	1,592	82,110	52	424	1,533	36	114	5,000	44
	1889	287	9,150	32	997	40,000	40	286	9,104	32	209	10,000	48
Freight and passenger.....	1906	554	20,614	37	1,592	82,110	52	514	18,280	36	.....	.....	.....
	1889	301	9,447	31	997	40,000	40	300	9,399	31	209	10,000	48
Yachts.....	1906	14	1,674	119	.....	.....	.....	14	1,674	119	.....	.....	.....
	1889	24	2,772	113	.....	.....	.....	24	2,772	113	.....	.....	.....
All other.....	1906	68	5,565	81	.....	.....	.....	65	5,605	86	114	5,000	44
	1889	46	5,522	119	.....	.....	.....	46	5,522	119	.....	.....	.....
Unrigged.....	1906	192	5,776	30	658	6,200	9	189	5,773	31	.....	.....	.....
	1889	130	1,688	13	.....	.....	.....	130	1,688	13	.....	.....	.....

The freight and passenger class and the unrigged craft, which together represented 92.9 per cent of the entire tonnage and comprised practically all of the freight carrying vessels in 1906, show great increases in their average tonnage. Steam freight and passenger vessels increased 381 tons each, or 104.1 per cent; the sailing vessels of this class made an average gain of 253 tons, or 84.1 per cent; and the unrigged craft increased 62 tons each, or 47.7 per cent. The average value of the freight and passenger vessels increased as follows: Steam, \$50,601, or 141.5 per cent, and sail, \$11,167, or 118.2 per cent; while the average for the unrigged vessels increased \$4,088, or 242.2 per cent. The metal freight and passenger vessels propelled by steam showed the largest average tonnage and also the largest average value in 1906 as in 1889. Metal sailing vessels of this class, although much less numerous than the steam craft, ranked second in average tonnage and third in

average value. The average tonnage of the freight and passenger metal built steamers increased 928, or 34.2 per cent. The wooden vessels of this class showed but a small increase in average size per vessel—21 tons, or 8.6 per cent—while the increase in average value was \$7,891, or 43 per cent. The metal freight and passenger vessels that were dependent upon sail power made an average gain of 595 tons, or 59.7 per cent. Of metal built vessels, ferryboats showed the most marked increase, the gain in average tonnage of these steam vessels being 1,067, or 257.1 per cent, and the increase in average value, \$185,000, or 462.5 per cent. The average size and value of ferryboats built of wood increased 182 tons and \$61,944, respectively. Towing vessels as a whole decreased 10 tons, or 11.5 per cent, in average size and \$5,296, or 33.1 per cent, in average value. The metal class increased 35 tons, or 24.6 per cent, in average size and \$10,764, or 31.9 per cent, in average

value; while those of wood construction decreased in average size 12 tons and in average value \$5,803, or 38.9 per cent.

DIAGRAM 1.—Relative amount of tonnage of metal and wooden vessels: 1875 to 1906.



Unrigged craft increased in all classes and for all items. In 1889 no metal construction was reported for unrigged vessels, but the 5 which were reported in 1906 averaged 658 tons in size and \$6,200 in value. Wooden construction in this class made an average increase of 59 tons, or 45.4 per cent, in size and \$4,085, or 242 per cent, in value.

CHARACTER OF PROPULSION AND HORSEPOWER.

Statistics showing character of propulsion and power are not available for previous censuses, but they were secured at the census of 1906.

Of the total number of vessels, 725, or 68 per cent, were steamers and 341, or 32 per cent, used gasoline. The steam vessels represented 511,607 tons, or 98.7 per cent of the total tonnage, and 435,020 horsepower, or 97.6 per cent of all the horsepower; while the vessels using gasoline embraced but 6,500 tons, or 1.3 per cent, with 10,697 horsepower, or 2.4 per cent of the total. The screw propeller was used in the propulsion of 78.5 per cent of the vessels, while 17.9 per cent were stern

wheelers, and 3.6 per cent were side wheelers. The tonnage of the three types of vessels formed 80.1 per cent, 13 per cent, and 6.8 per cent, respectively, of the total tonnage. The horsepower represented by these three classes was as follows: Screw propeller, 82.5 per cent; stern wheel, 12.2 per cent; and side wheel, 5.2 per cent. It is somewhat surprising to note the fact that the small number of side wheel vessels, mostly ferry-boats, so greatly exceeds all other classes in average tonnage and horsepower.

TABLE 15.—Number, gross tonnage, and horsepower of vessels, by character of propulsion and power, with average tonnage and horsepower: 1906.

PROPULSION AND POWER.	Number of vessels.	Gross tonnage.	Horse-power.	Average tonnage.	Average horse-power.
Total.....	1,066	518,107	445,717	486	418
Screw.....	837	415,100	367,875	496	440
Steam.....	507	408,849	357,503	806	705
Gasoline.....	330	6,251	10,372	19	31
Stern wheel.....	191	67,539	54,479	354	285
Steam.....	184	67,364	54,271	296	295
Gasoline.....	7	175	208	25	29
Side wheel.....	38	35,468	23,363	933	615
Steam.....	34	35,394	23,246	1,041	684
Gasoline.....	4	74	117	19	29

The largest American vessel in the United States belonged to the Pacific coast fleet. It is of interest to note the largest tonnage and the largest horsepower of the vessels of the various classes, although the largest horsepower, except for the side wheelers, was not that reported for the particular vessels for which the largest tonnage was shown.

TYPE.	LARGEST GROSS TONNAGE.		LARGEST HORSE-POWER.	
	Steam.	Gasoline.	Steam.	Gasoline.
Screw.....	20,718	534	12,000	300
Side wheel.....	3,549	39	2,000	65
Stern wheel.....	1,211	53	1,300	50

It is unfortunate that data as to the kinds of fuel used and the cost per horsepower are not available in connection with the foregoing description of the Pacific coast fleet. It was deemed impracticable to secure this information, just as it was to obtain reliable figures as to the number of miles the freight was carried. In view, however, of the scarcity of coal and the abundance of oil on the Pacific coast it will be surprising if there is not a more extensive use of fuel of the latter character, especially as recent experiments appear to have overcome, to a great extent, the objections to the use of oil under marine boilers.

TABLE 16.—*Character of propulsion and horsepower of steam vessels, by occupation: 1906.*

OCCUPATION.	CHARACTER OF PROPULSION.				HORSEPOWER OF ENGINES.		
	Total.	Screw (number).	Side wheel (number).	Stern wheel (number).	Total.	Steam.	Gasoline.
Total	1,066	837	38	191	445,717	435,020	10,697
Freight and passenger	604	455	5	144	362,182	355,849	6,333
Tugs and other towing vessels ..	313	272	2	39	50,284	47,764	2,520
Ferryboats	47	10	31	6	29,165	29,079	86
Yachts	66	66	.....	.....	2,047	810	1,237
All other	36	34	.....	2	2,039	1,518	521

The freight and passenger vessels formed the most numerous class, constituting 56.7 per cent of the total number and 81.3 per cent of the total horsepower. Of the 604 vessels of this class, 75.3 per cent was equipped with the screw propeller, 23.8 per cent was stern wheelers, and eight-tenths of 1 per cent was side-wheelers. Tugs and other towing vessels had a larger proportion of screw propellers, 86.9 per cent of the total for the class; while 12.5 per cent was stern wheelers, and only six-tenths of 1 per cent was side-wheelers. Ferryboats embraced most of the side wheel craft, as 81.6 per cent of the side wheel vessels was found in this class. It is also noticeable that gasoline was but little used in this class of vessels, as only three-tenths of 1 per cent of the total horsepower for ferryboats is shown as gasoline.

Yachts were wholly propelled by screw propellers, as were 34 of the 36 vessels embraced in the "all other" class. Of the 66 yachts using power, 58 used gasoline. The extent of this form of propulsion is not fully shown by these tables, as no reports were secured for boats of less than 5 tons, many of which were equipped with auxiliary power of this character. So extensive has become the practice of installing auxiliary power in small craft that comparatively few yachts are being built without such equipment, except those intended for racing purposes.

INCOME.

The income for the several classes of vessels was not shown separately in 1889, hence comparative statistics are not available for that census except by totals, as shown in Table 1. It is not claimed for the income presented in Table 17 that it is absolutely correct, but simply that it is a fair general presentation based upon a very careful and intelligent canvass but subject to inherent difficulties almost insuperable.

Of the income, 60.5 per cent was derived from freight and 21.5 per cent from passengers. The steam freight and passenger vessels had the largest income, almost \$30,000,000, or 61.2 per cent of the total income. The sailing vessels of this class had an income that formed

17.1 per cent of the total, and the combined income for the freight and passenger vessels amounted to \$37,969,854, or 78.3 per cent of the total income.

TABLE 17.—*Gross income—all vessels and craft, by class and occupation: 1906.*

CLASS AND OCCUPATION.	Total.	Freight.	Passenger.	All other.
Total	\$48,520,139	\$29,340,102	\$10,424,493	\$8,755,544
Steam	37,287,470	20,600,325	10,414,347	6,272,798
Freight and passenger	29,692,075	20,065,562	8,365,559	1,260,954
Tugs and other towing vessels ..	3,305,938	534,463	10,208	2,761,267
Ferryboats	4,208,430	.....	2,037,580	2,170,850
Yachts	2,500	.....	.....	2,500
All other	78,527	300	1,000	77,227
Sail	8,299,751	8,090,122	10,146	199,483
Freight and passenger	8,277,779	8,090,007	10,146	177,626
Yachts	100	.....	.....	100
All other	21,872	115	.....	21,757
Unrigged	2,932,918	649,655	.....	2,283,263

The income reported for tugs and other towing vessels amounted to 6.8 per cent of the total. For this class \$534,463 is reported as income from freight carried, which, as tugs are notoriously deficient as cargo carriers, no doubt represents charges for freight that was actually carried on unrigged vessels. Thus it often happened that where the tug and the tow were controlled by the same ownership the income for freight charges was reported for the tug; whereas if controlled by different ownerships, the tug was credited with the towing charges and the unrigged craft was credited with the income for the freight. The \$2,761,267 reported for this class under "all other" was mostly for towing. The income for ferryboats is nearly evenly divided between the transportation of passengers and "all other," the latter item for ferryboats being composed mostly of the estimated charges for transporting freight in bulk; that is, in cars across rivers or bays where the freight is not disturbed in transit. Unrigged craft had an income of 6 per cent of the total. Most of this income was reported as "all other" and represents what has been classed as lighterage, or short freight handling, generally harbor transfers of freight, to distinguish it from the regular freight shipments and in a measure avoid a duplication.

The freight reported as lightered amounted to 2,431,564 tons in 1889 and 4,321,523 tons in 1906, the increase being 1,889,959 tons, or 77.7 per cent.

Of the total income from passenger service, freight and passenger vessels, steam and sail, reported \$8,375,705, or 80.3 per cent, and ferryboats, \$2,037,580, or 19.5 per cent. The proportions for the two classes of vessels are reversed, however, in the case of the number of passengers carried.

The "all other" income, in addition to representing towing charges and lighterage, includes considerable amounts for dredging, pile driving, chartered vessels, etc.

EMPLOYEES AND WAGES.

No attempt is made to present comparative figures for employees and wages for 1889, because it is certain that the data were not collected on the same general lines at that census and the census of 1906, and there exists also a doubt as to the exact basis upon which the statistics for 1889 were secured. At the census of 1906, board was included as part compensation for employees on vessels, and, as has been explained, the total number of these employees was reported regardless of the

length of service. Thus the total wages for a vessel might be what would be earned by the crew for a few weeks or months in some instances and for the whole year in others, dependent entirely upon the period during which the vessel was in commission. When it is considered that the number of the crew necessary to operate a vessel would be the same whether for a long or a short period, it will readily be seen that average annual earnings based upon these figures would be misleading.

TABLE 18.—EMPLOYEES, AND SALARIES AND WAGES: 1906.

	TOTAL.		STEAM.		SAIL.		UNRIGGED.	
	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.
Total.....	25,519	\$17,190,022	17,954	\$12,796,638	5,972	\$3,213,438	1,593	\$1,179,946
On vessels.....	20,142	12,950,399	14,423	9,330,294	4,481	2,719,571	1,238	900,534
On land.....	5,377	4,239,623	3,531	3,466,344	1,491	493,867	355	279,412
Officers, managers, clerks, etc.....	1,853	1,768,849	1,678	1,641,438	159	98,643	16	28,768
All other.....	3,524	2,470,774	1,853	1,824,906	1,332	395,224	339	250,644

Table 18 embraces in one general total all classes of employees on the vessels, irrespective of their rank or duties. The land employees are divided into two classes, one including officers, managers, clerks, etc., and the other embracing chiefly laborers, stevedores, etc., engaged in loading or unloading vessels.

The employees on vessels formed 78.9 per cent of the total number of employees of all classes, and their salaries and wages amounted to 75.3 per cent of the total. The land force comprised 21.1 per cent of the total number for all classes of employees, and they were paid 24.7 per cent of the total amount expended in salaries and wages. A little more than one-third of the land force was officers, managers, clerks, etc., and nearly two-thirds was in the "all other" class.

Of the employees of all classes, 70.4 per cent was connected with steam vessels; 23.4 per cent, with sailing vessels; and 6.2 per cent, with unrigged craft. Salaries and wages were distributed as follows: Steam vessels, 74.4 per cent; sailing vessels, 18.7 per cent; and unrigged craft, 6.9 per cent.

FREIGHT.

The fact that the commodities shown for freight shipments are those selected for a schedule to be used to secure statistics for the country as a whole will explain the appearance in Table 19 of such commodities as cotton, tobacco, iron ore, etc., that are insignificant as applied to the Pacific coast, and yet are important in other sections of the country.

TABLE 19.—FREIGHT SHIPPED FROM SELECTED PORTS AND ALASKA, BY COMMODITIES: 1906.

COMMODITY.	Total.	Port-land.	Sacra-mento.	San Fran-cisco.	Seattle.	Stock-ton.	Tacoma.	Alaska.	All other ports.
Total.....net tons.	13,301,293	492,573	254,023	1,656,614	856,988	260,195	270,256	218,515	9,292,129
Canned goods.....net tons.	144,372	7,283	700	25,519	24,908	—	1,037	44,029	40,896
Cement, brick, and lime.....net tons.	251,677	5,834	8,078	55,524	2,590	1,256	4,810	—	173,585
Coal.....net tons.	451,781	730	3,099	30,865	178,805	—	29,468	3,037	205,777
Cotton.....net tons.	25,957	—	—	13,967	11,988	—	—	—	2
Flour.....net tons.	350,918	40,049	297	36,468	108,087	108,343	5,544	2,784	49,346
Fruits and vegetables.....net tons.	232,214	2,956	46	25,733	11,701	30,352	1,033	84	160,309
Grain.....net tons.	691,779	55,019	2,936	117,856	58,411	85,461	34,137	2,944	335,015
Ice.....net tons.	2,493	100	55	100	583	—	4	100	1,551
Iron ore.....net tons.	37	14	—	—	—	—	—	—	23
Lumber.....M feet ¹	1,981,930	145,023	7,511	86,829	58,056	2,031	78,174	6,753	1,597,553
Naval stores.....net tons.	10,267	—	—	1,170	7,383	—	1,000	—	714
Petroleum and other oils.....barrels ¹	10,929,939	9,271	64,432	62,120	50,356	33,160	2,577	31,689	10,676,334
Phosphate and fertilizer.....net tons.	37,144	182	—	12,028	1,432	—	185	1,500	21,819
Pig iron and steel rails.....net tons.	19,861	1,406	—	1,898	12,261	—	301	7	3,988
Stone, sand, etc.....net tons.	2,340,008	2,355	—	10,210	325	3,000	—	—	2,324,118
Tobacco.....net tons.	2,115	162	—	152	1,736	—	13	12	40
Miscellaneous merchandise.....net tons.	3,536,392	117,606	211,171	1,157,213	322,850	20,768	55,339	144,793	1,506,652

¹ Reduced to net tons for total.

It would be desirable to present comparative statistics with the census of 1889, but the difference in the methods of securing the data, together with the uncertainty as to what was reported at that census, renders such a comparison of doubtful value.

In 1906 there were many difficulties to be contended with in securing reliable figures as to the kind and total amount of freight carried, and to these were added the destruction of records by the great conflagration following the earthquake in San Francisco.

It must be understood, therefore, that in spite of a general willingness on the part of the shipping interests to cooperate with the Office, and comply with the requirements of the census, much of the information was necessarily in the character of estimates. In the aggregate, however, it is believed the presentation is a fair approximation of the freight movements by Pacific coast vessels.

Of the commodities specifically named in Table 19, that of most importance was lumber, with 1,981,930 thousand feet, equivalent to 3,504,742 tons, or 26.3 per cent of the total freight shipments. This showing is not unexpected, in view of the great wealth of the Pacific coast in timber. At the census of 1905, California, Oregon, and Washington together contributed 12.6 per cent of the value of the total sawmill products of the country, while of the total estimated stand of merchantable timber, these 3 states held 38.5 per cent. So vast, indeed, is the business in this single commodity that an enormous fleet of steam and sailing vessels is necessary to meet the demand for its movement. The quantity of lumber reported in this table is exclusive of logs which may have been moved in the shape of rafts. Some of the logs so rafted were included in the census of 1889, and the fact that the extent to which they were included is uncertain, forms one of the reasons why comparisons with that census were found to be impracticable. An effort was made to ascertain the amount of logs rafted in 1906, but without success.

It is understood, however, that the rafting of logs was carried on to some extent in 1906. One of these rafts containing 6,000 logs, equivalent to 4,500,000 feet of lumber, was towed from the Columbia river to San Diego, Cal., a distance of about 1,000 miles. In addition to a great saving in the cost by this method of transportation, there is a gain to the shipper from the fact that most of the waste material which at the point of shipment is considered as refuse has a considerable value at the place of delivery—enough, it is claimed, to defray the cost of transportation.

Stone, sand, etc., is next in rank, with 2,340,008 tons, to which might be added the 251,677 tons of cement, brick, and lime, commodities that are suggestive of the extensive building operations of this section of the country. The total for these two items is 2,591,685 tons, or 19.5 per cent of all shipments. The oil wells of California are a source of considerable mineral wealth, as is shown by the fact that the state ranked third in these products, with 15.7 per cent of the total production for the country, at the census of mines and quarries taken in 1902. Shipments of oil were reported to the extent of 10,929,939 barrels, equivalent to 1,699,536 tons, or 12.8 per cent of the entire coast shipments of all classes of freight. Grain, flour, and fruits and vegetables are agricultural products that largely represent the fertility of the Pacific coast states, and have made that section of the country known in most parts of the civilized world. The

shipments of grain, flour, and fruits and vegetables amounted to 1,274,911 tons, or 9.6 per cent of the total freight shipments.

Coal is not extensively mined in the Pacific coast states and in but one, Washington, is the output of this mineral worthy of mention. The shipment, therefore, in 1906 of 451,781 tons of coal is not significant of the production of coal on the Pacific coast, as it represents largely the shipments of this article from foreign ports in American vessels.

The only important commodity remaining is canned goods, which formed 1.1 per cent of the total tonnage of all shipments. The extent of the shipments of canned goods on the Pacific coast, which was more than one-third of the total shipments of this class of goods for the entire country, is not unexpected when it is considered that at the census of 1905 the value of the products of canned fruits and vegetables for California alone was nearly one-third of the total for the country, and the value of the products of the fish canneries of the three Pacific coast states and Alaska combined was more than one-half of the total value of products for this entire industry at the same census.

At the beginning of the canvass of the Pacific coast, 23 cities, or ports, were selected as those for which the attempt would be made to show the freight shipments by commodities.

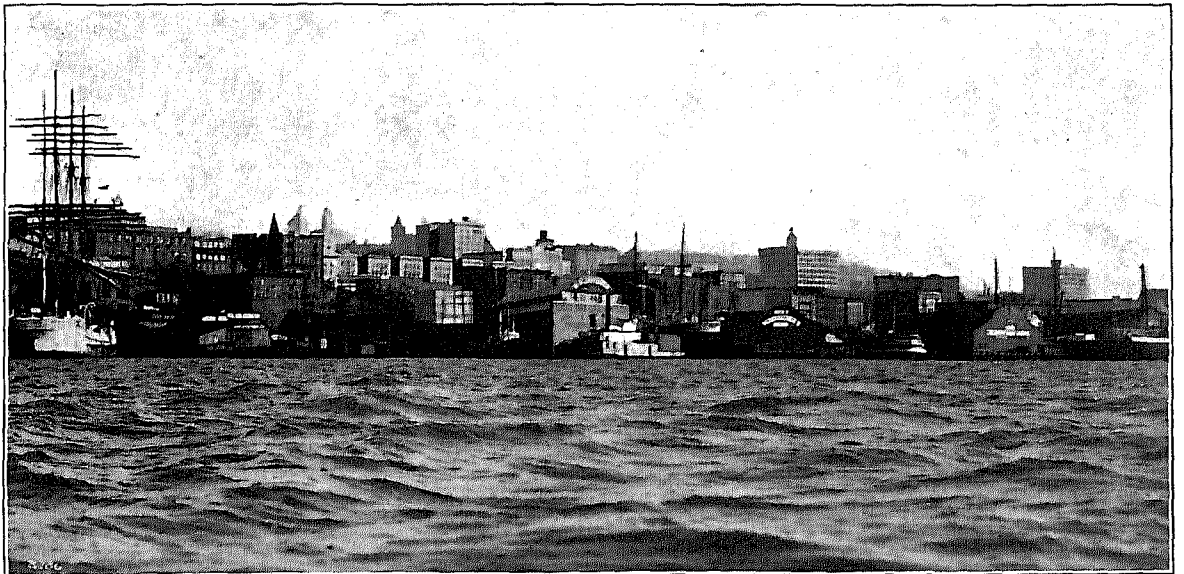
Six of these cities and the territory of Alaska are specifically shown in Table 19. Eureka had shipments amounting to 489,521 tons, but as only two items of commodities, lumber and miscellaneous merchandise, were specifically reported, it was omitted from this table, which is intended to show shipments from ports where the freight was of a more general or diversified character. With this one exception, therefore, the cities are those having the highest rank in shipments of freight in American vessels during 1906. The 6 cities in the order of their importance as to freight shipments are shown in the following tabular statement:

CITY.	Freight shipments (net tons).	Per cent of total for six cities.	Per cent of total for Pacific coast.
Total.....	3,790,649	100.0	28.5
San Francisco.....	1,656,614	43.7	12.5
Seattle.....	856,988	22.6	6.4
Portland.....	492,573	13.0	3.7
Tacoma.....	270,256	7.1	2.0
Stockton.....	260,195	6.9	2.0
Sacramento.....	254,023	6.7	1.9

The largest amount of freight, 9,292,129 net tons, or 69.9 per cent of the total for the coast, was shipped from numerous ports and places which it is impracticable to show in this table. Lumber, stone, sand, etc., and oil contributed largely to the total, and were the character of freight that might be looked for as shipments from places unimportant from a standpoint of general marine business.



FERRY BUILDING, SAN FRANCISCO, CAL.



COMPREHENSIVE VIEW OF THE WATER FRONT AT SEATTLE, WASH.

PASSENGERS.

There was an increase of 28,517,878, or 182 per cent, in the number of passengers carried in 1906, as compared with 1889. Of this increase, 25,240,495, or 88.5 per cent, were ferry passengers, and 3,277,383, or 11.5 per cent, were classed as "all other," or those carried on vessels engaged in foreign, coastwise, and river traffic. The proportion of "all other" passengers to the total of all passengers carried was larger in 1906 than in 1889.

TABLE 20.—Number of passengers, with per cent of total and per cent of increase: 1906 and 1889.

	NUMBER.		PER CENT OF TOTAL.		Per cent of increase.
	1906	1889	1906	1889	
Total.....	44,189,971	15,672,093	100.0	100.0	182.0
Ferry.....	39,632,354	14,291,859	89.5	91.2	176.6
All other.....	4,657,617	1,380,234	10.5	8.8	237.5

The census figures do not show the number of these passengers by ports or districts, but an idea of the relative rank of several of the more important districts may be had from the following statement, taken from the report of the Steamboat Inspection Service, 1906. These figures, however, represent the fiscal year ending June 30, 1906, instead of the calendar or census year ending December 31, 1906.

LOCAL INSPECTION DISTRICT.	Number of passengers.
San Francisco.....	35,482,941
Seattle.....	3,170,452
Portland.....	2,318,850

IDLE VESSELS.

In addition to the 2,537 active vessels for which statistics have been presented in the foregoing tables, reports were received for a number of idle vessels, although there was no special canvass of such vessels. The special agents when obtaining reports for active vessels were instructed to secure information for idle vessels wherever found, but they were not to make special trips to secure reports for such vessels; consequently it is not claimed that Table 21 is complete.

TABLE 21.—Idle vessels: 1906.

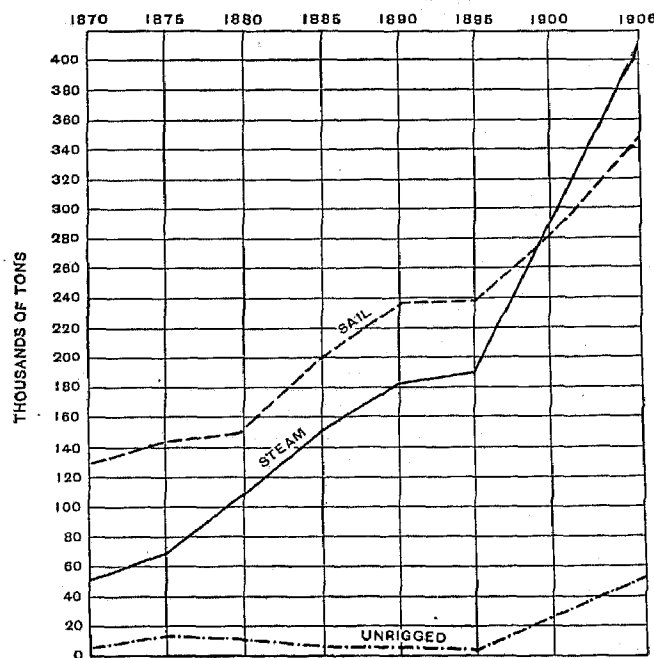
CLASS.	Number of vessels.	Gross tonnage.	Value of vessels.
Total.....	252	28,220	\$2,062,793
Steam.....	145	21,994	1,851,731
Sail.....	43	1,391	69,935
Unrigged.....	64	4,844	141,127

CONDITIONS BETWEEN CENSUS YEARS.

The foregoing statistics are those for two distinct periods, 1889 and 1906, censuses so widely apart that they leave much to be desired as to conditions for the intervening years. Another view, therefore, is presented in Table 22 as to the number and tonnage of the Pacific coast merchant marine fleet for each year from 1889 to 1906.

The statistics taken from the reports of the Commissioner of Navigation are not comparable with those taken by the Census, since, even if the data were secured on the same general lines, the report of the commissioner was for the fiscal year ending June 30, while that for the Census represents the calendar year ending December 31. The figures from the reports of the commissioner do not include yachts, or barges without sails or internal motive power of their own, but do include fishing vessels, while the Census figures do not include fishing vessels but do include yachts and barges. The difference in the methods of accounting for the classes of vessels which were common to both reports, is also a factor of considerable uncertainty, for whereas the registered and enrolled and licensed vessels of Table 22 include those recorded at the various customs districts, many vessels operating on the Pacific coast may be omitted if they were built and documented in other sections of the country. The Census figures, on the other hand, are for vessels operated on the Pacific coast, irrespective of the place of building.

DIAGRAM 2.—Relative amount of tonnage, steam, sail, and unrigged vessels: 1870 to 1906.



As might be expected, the larger proportion of the tonnage is found in the enrolled and licensed vessels, or those primarily intended for coastwise and inland trade, this class in 1906 representing 59.8 per cent of tonnage for all vessels, compared with 40.2 per cent for the registered vessels, or those qualified for foreign trade. Although in 1906 the steam and sail tonnage was very evenly distributed, there was a small preponderance in favor of steam craft. The largest total tonnage, 817,572, was reported for the year 1906, and the smallest, 428,392, for 1890. For three successive years, 1893, 1894, and 1895, there was a decrease in total tonnage, as compared with the year next

preceding, the largest decrease shown for any one year being in 1895, and amounting to 22,857 tons, or 5 per cent. Of this decrease, 17,213 tons were for sailing vessels and 5,644 tons for steam craft. Two other years, 1890 and 1904, showed actual losses. Thus, of the years for which the figures are given, five showed losses and twelve increases. The greatest actual increase is shown for 1901 and amounted to 75,470 tons, or 12.6 per cent, 41,402 tons being for sailing vessels and 34,068 tons for steamers. In 1906 both steam and sail vessels reached their highest tonnage. For steam craft the smallest tonnage is shown for 1889 and for sailing vessels the smallest is for 1896.

TABLE 22.—NUMBER AND GROSS TONNAGE OF REGISTERED, ENROLLED, AND LICENSED SAIL AND STEAM VESSELS CONSTITUTING THE TOTAL MERCHANT MARINE OF THE PACIFIC COAST, INCLUDING FISHING VESSELS: 1889 TO 1906.¹

YEAR.	TOTAL MERCHANT MARINE.								ENROLLED AND LICENSED VESSELS, UNDER 20 TONS.							
	Total.			Sail. ²		Steam.			Total.			Sail. ²		Steam.		
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.		Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	
1906.....	2,787	817,572	3.1	1,463	404,241	1,324	413,331		1,946	488,664	2.5	873	240,171	1,073	248,493	
1905.....	2,674	793,088	2.3	1,458	396,337	1,216	396,751		1,926	476,672	3.7	928	246,942	998	229,730	
1904.....	2,542	775,255	*0.1	1,422	389,752	1,120	385,503		1,942	459,540	1.1	1,013	239,411	920	220,138	
1903.....	2,575	775,859	4.6	1,509	396,901	1,066	378,958		2,047	454,733	8.9	1,174	239,358	873	215,375	
1902.....	2,492	741,825	9.6	1,496	390,606	996	351,219		2,001	417,503	8.4	1,188	218,128	813	199,375	
1901.....	2,387	676,682	12.6	1,467	351,761	920	324,921		1,907	385,193	22.2	1,169	203,974	738	181,219	
1900.....	2,263	601,212	11.3	1,352	310,359	850	290,853		1,660	315,130	24.7	1,019	144,317	650	170,813	
1899.....	1,970	539,937	8.7	1,176	270,701	794	269,236		1,431	252,613	1.4	865	115,380	566	137,283	
1898.....	1,754	496,767	13.2	1,056	259,045	698	237,722		1,292	249,079	1.0	796	113,700	496	129,372	
1897.....	1,581	439,012	0.2	978	243,666	603	195,146		1,208	246,541	0.7	736	110,707	472	132,841	
1896.....	1,560	437,972	1.0	978	242,607	582	195,365		1,192	244,815	1.1	712	110,368	451	125,896	
1895.....	1,525	433,502	*5.0	951	242,940	574	190,562		1,163	242,264	*1.5	712	109,299	401	135,516	
1894.....	1,520	456,359	*0.2	938	260,153	582	196,206		1,145	246,001	*7.5	688	114,328	457	131,673	
1893.....	1,549	457,422	*1.5	955	258,406	594	199,016		1,198	266,020	4.5	728	134,775	470	131,245	
1892.....	1,545	464,620	5.4	945	262,154	600	202,466		1,163	254,623	14.0	705	121,230	458	133,393	
1891.....	1,458	440,858	2.9	880	253,429	578	187,429		1,046	223,266	9.8	619	106,423	427	116,943	
1890.....	1,402	428,392	*1.8	851	244,612	551	182,780		996	203,409	*10.9	585	90,825	411	112,584	
1889.....	1,392	436,273		866	254,764	526	181,509		1,026	228,409		625	115,586	401	112,823	

YEAR.	REGISTERED VESSELS.							
	Total.			Sail. ²		Steam.		
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	
1906.....	841	328,908	3.9	590	164,070	251	164,838	
1905.....	748	316,416	0.2	530	149,395	218	167,021	
1904.....	600	315,706	*1.7	409	150,341	191	165,365	
1903.....	528	321,126	*1.0	335	157,543	193	163,583	
1902.....	491	324,322	11.3	308	172,478	183	151,844	
1901.....	480	291,499	1.9	298	147,787	182	143,702	
1900.....	534	286,082	*0.4	334	160,042	200	120,040	
1899.....	539	287,324	16.0	311	155,371	228	131,953	
1898.....	462	247,688	28.7	260	139,338	202	108,350	
1897.....	373	192,471	*0.4	242	130,166	131	62,305	
1896.....	368	193,157	1.0	247	133,308	121	59,849	
1895.....	362	191,238	*9.1	239	126,572	123	64,666	
1894.....	375	210,358	9.9	250	145,825	125	64,533	
1893.....	351	191,402	*8.9	227	123,631	124	67,771	
1892.....	382	209,997	*3.5	240	140,924	142	69,073	
1891.....	412	217,592	*3.3	261	147,006	151	70,586	
1890.....	406	224,983	8.2	266	153,787	140	71,196	
1889.....	366	207,864		241	139,178	125	68,686	

¹ From the reports of the Commissioner of Navigation, Department of Commerce and Labor.

² Including barges.

³ Decrease.

Enrolled and licensed vessels attained their highest tonnage in 1906 and their smallest in 1890. In this class for steam vessels the largest tonnage was reported in 1906 and the smallest in 1890, and for sailing vessels the largest in 1905 and the smallest in 1890. The

years of most notable increase in the tonnage for the enrolled and licensed vessels were 1900 and 1901, with 62,517 tons and 70,063 tons, respectively. The registered vessels also showed their greatest tonnage in 1906, but their smallest was in 1895. The registered

steamers showed their largest tonnage in 1905 and their smallest in 1896. The sailing vessels of this class reached their greatest tonnage in 1900 and their smallest in 1893. The years 1898, 1899, and 1902 showed the largest increases in the total tonnage of registered vessels, 55,217 tons, 39,636 tons, and 32,833 tons, respectively. When the tonnage of 1906 is compared with that of 1889, the total for all vessels shows an increase of 381,299 tons, or 87.4 per cent. Enrolled and licensed vessels increased 260,255 tons, or 113.9 per cent, and registered vessels increased 121,044 tons, or 58.2 per cent. The number of years when a loss was recorded was greatest for registered ves-

sels, this class showing a decrease for each of eight years compared with three for enrolled and licensed vessels.

WATERS OPERATED UPON.

In making a segregation of the statistics for all vessels of the Pacific coast merchant marine according to the waters upon which they operated in 1906, some difficulty was experienced in properly classifying all the vessels engaged in foreign or coastwise trade, because they frequently engaged in both to a greater or less extent. The division was made, therefore, on the basis of the preponderance of trade the vessel was engaged in during the census year of 1906.

TABLE 23.—NUMBER OF VESSELS, TONNAGE, ETC., BY WATERS OPERATED UPON: 1906.

	NUMBER OF VESSELS.				GROSS TONNAGE.				Horse-power.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).
	Total.	Steam.	Sail.	Un-rigged.	Total.	Steam.	Sail.	Un-rigged.							
Total.....	2,537	1,066	666	805	977,087	518,107	305,283	154,297	445,717	\$76,622,633	\$48,520,139	20,142	\$12,950,309	44,189,971	13,301,293
Foreign.....	86	30	56	—	262,298	184,373	77,925	—	150,400	27,805,549	9,690,044	3,858	1,862,268	71,318	880,194
Coastwise.....	716	306	326	84	400,907	214,116	218,429	28,362	102,313	31,733,214	23,134,520	9,605	6,123,844	573,826	6,217,595
Internal ¹	1,098	443	150	505	141,983	71,695	0,249	64,039	86,537	11,075,700	10,986,487	4,025	3,066,879	40,377,504	2,803,311
Columbia and tributary rivers.....	237	123	5	109	59,271	28,774	109	30,328	32,133	2,901,718	2,514,523	1,388	873,128	2,581,691	2,098,818
Sacramento river.....	75	34	4	37	23,304	5,575	119	17,610	4,480	778,200	661,604	323	285,788	74,987	669,821
San Joaquin river.....	85	39	9	37	22,795	10,309	386	12,100	5,904	1,007,800	1,260,725	686	556,408	140,743	551,457
On both the Sacramento and San Joaquin rivers ²	18	5	12	1	1,841	794	547	500	725	129,137	89,659	70	43,168	10,038	48,299
All other rivers.....	52	20	—	32	2,764	1,406	—	1,358	1,178	122,345	143,977	93	54,665	57,064	31,768
Pleasure boats.....	170	66	104	—	2,524	1,065	1,459	—	2,047	468,910	2,600	94	45,161	—	—

¹ Vessels included under this heading are those operated on waters like Puget Sound, San Francisco bay, and other waters of this character that are not otherwise specifically covered.

² The vessels plied on both of these rivers, and therefore the statistics can not be separately credited to either.

TABLE 24.—PER CENT, NUMBER OF VESSELS, TONNAGE, ETC., BY WATERS OPERATED UPON: 1906.

	PER CENT OF TOTAL.														
	Number of vessels.				Gross tonnage.				Horse-power.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).
	Total.	Steam.	Sail.	Un-rigged.	Total.	Steam.	Sail.	Un-rigged.							
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Foreign.....	3.4	2.8	8.4	—	26.8	35.6	25.5	—	33.7	36.3	20.0	19.2	14.6	0.2	6.6
Coastwise.....	28.2	28.7	48.9	10.4	47.1	41.3	71.5	18.4	36.4	41.4	47.7	47.7	47.3	1.3	46.7
Internal ¹	43.3	41.6	22.5	62.7	14.5	13.8	2.0	41.5	19.4	15.2	22.6	20.0	23.7	92.1	21.1
Columbia and tributary rivers.....	9.3	11.5	0.8	13.5	6.1	5.6	0.1	19.7	7.2	3.8	5.2	6.9	6.7	5.8	15.8
Sacramento river.....	3.0	3.2	0.6	4.6	2.4	1.1	(²)	11.4	1.0	1.0	1.4	1.6	2.2	0.2	5.0
San Joaquin river.....	3.4	3.7	1.4	4.6	2.3	2.0	0.1	7.8	1.3	1.3	2.6	3.4	4.4	0.3	4.1
On both the Sacramento and San Joaquin rivers ²	0.7	0.5	1.8	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	(³)	0.4
All other rivers.....	2.0	1.9	—	4.0	0.3	0.3	—	0.9	0.3	0.2	0.3	0.5	0.4	0.1	0.2
Pleasure boats.....	6.7	6.2	15.6	—	0.3	0.2	0.5	—	0.5	0.6	(²)	0.5	0.3	—	—

¹ Vessels included under this heading are those operated on waters like Puget Sound, San Francisco bay, and other waters of this character that are not otherwise specifically covered.

² Less than one-tenth of 1 per cent.

³ The vessels plied on both of these rivers, and therefore the statistics can not be separately credited to either.

In accordance with this division there were 86 vessels engaged wholly, or nearly so, in foreign trade, carrying a total of 880,194 tons of freight; they formed 3.4 per cent of the total number of vessels reported, and carried 6.6 per cent of the total amount of freight. The tonnage, however, of these 86 vessels amounted to 26.8 per cent of the total for vessels of all classes on the Pacific coast, with other features as follows: Horsepower, 33.7 per cent; value, 36.3 per cent; income, 20 per cent; number of employees on vessels, 19.2 per cent; wages, 14.6 per cent; and number of

passengers carried, two-tenths of 1 per cent. Of all vessels reported at the census of 1906, the number of those which were at any time during the year carrying freight to foreign ports from the Pacific coast, whether such service represented the whole, the major part, or only a small fraction of the business, amounted to 171 vessels of 348,748 tonnage. These vessels were valued at \$34,589,562 and carried 961,382 tons of freight. Thus the additional 85 vessels had a tonnage of 86,450, while the freight carried by them amounted to but 81,188 tons, compared with 880,194 tons for

the 86 which have been classed as engaged wholly in foreign trade. Steamers plying in foreign waters were credited with 35.6 per cent of the tonnage and the sailing vessels with 25.5 per cent.

Coastwise vessels formed the most important class, and were very evenly divided between steam and sail vessels as to number and tonnage. The coastwise vessels are credited with 28.2 per cent of the total number of vessels, 47.1 per cent of the tonnage, 36.4 per cent of the horsepower, 41.4 per cent of the value, 47.7 per cent of the income, 47.7 per cent of the number of employees, 47.3 per cent of the wages, and 46.7 per cent of the tonnage of freight carried. Thus in most of the items the coastwise class represented nearly one-half the totals for all classes combined.

The largest number of vessels in any one class, 1,098, is found in the class operated upon internal waters, which represents those craft plying on Puget Sound, on San Francisco, San Pablo, or San Diego bays, on Grays harbor, and on other similar waters. Following the method of classification used for the foreign vessels, these craft are those whose operations were confined chiefly to such waters. Of these 1,098 vessels, forming 43.3 per cent of all classes, the larger proportion was steam, with a tonnage of 71,695, or 13.8 per cent of the total steam tonnage. The tonnage of the unrigged vessels operated on internal waters formed 41.5 per cent of the tonnage of all unrigged craft, and the sail vessels had a tonnage that was 2 per cent of the tonnage of all sail vessels. The internal class embraced the largest tonnage of unrigged craft, and ranked second for income, number of employees on vessels and their wages, and in tonnage of freight carried. In number of passengers carried this class far outranked all others, as all of the important ferries, except those at Portland, Oreg., are on these waters.

The Columbia and tributary rivers were third in importance. With the exception of number of vessels and amount of wages, the totals for this class were in excess of those for all of the remaining classes combined, ranking fourth in tonnage, horsepower, value of vessels, income, number of employees on vessels, and wages; second in number of passengers carried, because of the ferry across the Willamette at Portland, Oreg.; and third in freight carried. Comparatively little sail tonnage was found on any of the rivers of the Pacific coast, and the steam tonnage and unrigged tonnage were very evenly divided.

There is but little difference between the figures for the number of vessels and the gross tonnage for the Sacramento and the San Joaquin rivers, but the San Joaquin easily had the lead in the other principal items, the differences being as follows: Horsepower, 1,424, or 31.8 per cent; value of vessels, \$229,600, or 29.5 per cent; income, \$575,121, or 83.2 per cent; number of employees on vessels, 363, or 112.4 per cent; wages, \$280,620, or 98.2 per cent; and number of pas-

sengers carried, 65,756, or 87.7 per cent. The tonnage of freight carried, however, was less by 118,334 tons, or 17.7 per cent. In addition to the 160 vessels reported as operating on these two rivers there were 18 plying on both whose operations were so interwoven that it was impracticable to properly assign them to either, so they are shown as a separate class in Table 23. They are of less average tonnage than those shown separately for either the Sacramento or the San Joaquin, having a tonnage amounting to only 1,841 and carrying freight amounting to 48,299 tons.

In addition to the rivers for which statistics are shown in the table, a number of rivers have been grouped and styled "all other rivers." This group includes the Chehalis, Coquille, Skagit, Snohomish, and Umpqua, and quite a number of other rivers of less importance. On these rivers are operated 52 vessels having a total tonnage of 2,764, or an average of 53.2 tons per vessel. The tonnage was very evenly divided between steam and unrigged craft, there being no sailing vessels. The craft on these rivers carried 57,064 passengers and 31,768 tons of freight, and had an income of \$143,977.

The 170 pleasure boats are included in this table merely to bring the totals to that shown in other tables for the whole Pacific coast fleet. Pleasure boats have no real place in a table of this character, since they may be found in any waters at the option of the owners.

EXPORTS.

The total value of exports of domestic merchandise from the Pacific coast and the proportion carried on American vessels are shown by the report of the Bureau of Statistics.

TABLE 25.—Exports of domestic merchandise on vessels, for the United States and the Pacific coast: 1906.¹

CLASS AND LOCALITY.	Total.	AMERICAN.		FOREIGN.	
		Amount.	Per cent.	Amount.	Per cent.
<i>All vessels.</i>					
United States.....	\$1,534,657,888	\$151,339,368	9.9	\$1,383,318,520	90.1
Pacific coast.....	96,748,326	47,200,030	48.8	49,548,296	51.2
San Francisco.....	39,328,722	25,477,268	64.8	13,851,454	35.2
Puget Sound.....	45,799,328	20,817,499	45.5	24,981,829	54.5
All other Pacific coast ports ²	11,660,276	905,263	7.8	10,755,013	92.2
<i>Steam vessels.</i>					
United States.....	1,480,903,442	141,324,694	9.5	1,339,578,748	90.5
Pacific coast.....	79,185,041	45,625,739	57.5	33,559,302	42.5
San Francisco.....	34,465,318	25,181,025	73.1	9,284,293	26.9
Puget Sound.....	37,797,123	19,908,255	52.7	17,888,868	47.3
All other Pacific coast ports ²	6,922,600	436,459	6.3	6,486,141	93.7
<i>Sailing vessels.</i>					
United States.....	44,754,446	10,014,674	22.4	34,739,772	77.6
Pacific coast.....	17,563,285	1,674,291	9.5	15,888,994	90.5
San Francisco.....	4,863,404	296,243	6.1	4,567,161	93.9
Puget Sound.....	7,962,205	909,244	11.4	7,052,961	88.6
All other Pacific coast ports.....	4,737,676	468,804	9.9	4,268,872	90.1

¹ Bureau of Statistics, Department of Commerce and Labor, "Commerce and Navigation of the United States," 1906.

² Includes Hawaii.

The exports of domestic merchandise are exclusive of those carried in cars or other land vehicles, which were valued at \$183,295,494 for the country as a whole and \$4,012,418 for the Pacific coast.

Of the total value of exports of domestic merchandise, only 6.3 per cent was credited to the Pacific coast. There is little doubt that the hauls were longer and the trips less frequent on the Pacific than on the Atlantic coast, but to what extent these factors influenced the small proportion shown is uncertain. On the other hand, of the total value of the exports of domestic merchandise carried on American vessels, 31.2 per cent was carried by American vessels on the Pacific coast. Another view of these exports is significant of the importance of American vessels on the Pacific coast, for whereas American vessels carried 48.8 per cent of the value of all shipments of domestic merchandise from this section, they carried but 9.9 per cent for the country as a whole.

Of the total Pacific coast exports of domestic merchandise, 81.8 per cent was carried on steamers and 18.2 per cent on sailing vessels, which illustrates the importance of the steamer in the foreign trade.

Of the total value of these Pacific coast shipments in American vessels, steamers carried 96.5 per cent of the total value, showing that the steamer has a practical monopoly of the export trade on the Pacific coast so far as American vessels are concerned. The proportions are not nearly so pronounced for foreign vessels on the Pacific coast, the figures being as follows: Steamers, 67.9 per cent; sailing vessels, 32.1 per cent.

The bulk of the exports shipped from the Pacific coast is shown for the ports of San Francisco and Puget Sound, the value for these ports amounting to \$85,088,050, or 87.9 per cent, compared with \$11,660,276, or 12.1 per cent, for all other ports. Of the total value of all such shipments, Puget Sound ports are credited with 47.3 per cent and San Francisco with 40.7 per cent.

CONGRESSIONAL APPROPRIATIONS.

The first appropriation for the improvement of any of the rivers or harbors of the Pacific coast was made by Congress in 1852, at which time \$30,000 were appropriated for building a levee across the mouth of the San Diego river to turn it into its former channel.

Table 26 shows the appropriations for the survey, improvement, and maintenance of the rivers and harbors of the Pacific coast, by periods and by the states in which the various localities improved are situated. In the case of rivers which flow through more than one state or separate two states, it has been impossible to apportion the amount appropriated and the total has therefore been shown under "miscellaneous."

TABLE 26.—Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Pacific coast, by periods and localities.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1900, inclusive.	March 2, 1907.
Aggregate.....	1852	\$34,061,782	\$10,248,592	\$21,204,844	\$2,608,346
California.....	1852	13,374,562	4,128,177	8,792,788	453,602
Alviso harbor.....	1899	48,000		48,000	
Deepwater harbor.....	1890	65,000	5,000	60,000	
Humboldt harbor and bay.....	1881	2,270,615	422,500	1,765,115	83,000
Mokelumne river.....	1884	23,000	13,000	10,000	2,500
Napa river.....	1888	33,029	17,500	16,429	(¹)
Oakland harbor.....	1874	2,940,803	1,534,600	1,347,000	68,203
Petaluma creek.....	1880	93,239	30,000	34,000	23,239
Redwood harbor and creek.....	1884	31,800	23,400	8,400	
Sacramento and Feather rivers.....	1875	957,000	505,000	402,000	50,000
San Diego harbor and river.....	1852	685,350	172,500	492,850	20,000
San Francisco harbor.....	1868	424,927	154,927	270,000	
San Joaquin river.....	1876	554,670	288,750	265,920	30,000
San Luis Obispo harbor.....	1888	368,660	65,000	240,000	63,660
San Pablo bay.....	1902	353,168		353,168	
San Pedro bay.....	1896	2,707,085		2,707,085	
Stockton and Mormon channel.....	1902	224,316		224,316	
Surveys.....	1880	16,000	10,000		
Wilmington harbor.....	1871	1,568,000	804,000	551,000	113,000
Idaho.....	1879	37,705	15,000	22,705	
Clearwater river.....	1879	37,705	15,000	22,705	
Montana.....	1896	10,000		10,000	
Flathead river.....	1896	10,000		10,000	
Oregon.....	1871	3,306,100	1,440,050	1,733,050	133,000
Alsea river.....	1896	3,000		3,000	
Clatskanie river.....	1899	13,000		13,000	
Coos bay and harbor.....	1879	981,640	338,750	642,890	
Coos river.....	1896	10,000		13,000	3,000
Coquille river.....	1880	386,000	105,000	221,000	60,000
Nehalem Bay harbor.....	1890	10,000	10,000		
Nestucca river.....	1896	6,000		6,000	
Port Oxford harbor of refuge.....	1882	150,000	150,000		
Siuslaw river.....	1890	187,000	50,000	137,000	
Tillamook bay and bar.....	1888	125,700	5,700	110,000	10,000
Umpqua river.....	1871	30,500	33,500	6,000	
Willamette and Yamhill rivers.....	1871	676,660	195,500	421,160	60,000
Yaquina bay.....	1880	710,000	550,000	160,000	
Yongs and Klaskanine rivers.....	1890	1,600	1,600		
Washington.....	1880	3,835,350	111,500	3,124,350	599,500
Chehalis river.....	1882	19,000	13,000	6,000	
Cowlitz river.....	1880	55,150	19,000	21,150	15,000
Everett harbor.....	1894	422,000		422,000	
Grays harbor and bar.....	1896	1,230,000		1,030,000	200,000
Grays harbor and Chehalis river.....	1892	332,000		155,000	177,000
Grays river.....	1907	2,500			2,500
Lake Washington canal.....	1890	480,000	10,000	400,000	10,000
Lewis river.....	1899	20,350		20,350	(¹)
Naselle river.....	1892	1,500		1,500	
New Whatcom harbor.....	1902	60,000		60,000	
Okanogan and Pend d'Oreille rivers.....	1899	82,500		62,500	20,000
Olympia harbor.....	1892	147,000		147,000	
Puget Sound and its tributaries.....	1880	335,500	69,500	191,000	75,000
Snohomish river.....	1905	6,500		6,500	
Swinomish slough.....	1892	205,000		130,000	75,000
Tacoma harbor.....	1902	375,000		375,000	
Willapa harbor and river.....	1892	61,350		36,350	25,000
Miscellaneous.....	1866	13,408,065	4,553,865	7,521,950	1,422,244
Colorado river.....	1884	35,000	25,000	10,000	
Columbia river, Cascades canal.....	1876	3,956,732	1,947,500	2,000,232	
Columbia river at its mouth.....	1878	5,593,424	1,355,000	3,488,180	750,244
Columbia river at Celilo falls.....	1888	885,000	15,000	650,000	220,000
Columbia river, miscellaneous.....	1882	326,000	5,000	279,000	42,000
Columbia and Willamette rivers.....	1890	2,095,365	880,365	915,000	300,000
Columbia and Snake rivers.....	1872	496,544	326,000	160,544	10,000
Kootenai river.....	1896	10,000		10,000	
Dredge boats.....	1907	100,000			100,000

¹ Included with appropriation for Petaluma creek.

² Includes appropriation for Napa river.

³ Includes appropriation for Lewis river.

⁴ Included with appropriation for Cowlitz river.

⁵ Includes appropriations made for improvements below Tongue point, between mouth of Willamette river and Vancouver, between Wenatchee and Bridgeport, and for gaging.

Of the total appropriation for the improvement of the Pacific coast rivers and harbors, less than one-third was appropriated up to and including 1890. Among the states on the Pacific coast, California led in the amount appropriated by Congress for the betterment of the rivers and harbors within its boundaries. Oakland harbor has received nearly \$3,000,000 in appropriations, and San Pedro bay and Humboldt harbor and bay each over \$2,000,000. Between the figures shown for this state at the census of 1889 and those shown in this report for the same period there is a difference of \$89,927, which was caused by the omission at the former census of appropriations amounting to \$94,927 made prior to 1890, and to the erroneous inclusion of \$5,000 accredited to San Diego harbor and river.

In the case of other states similar reasons account for many of the differences between the figures of the two censuses. In the case of Oregon, however, the apparent difference is due to the inclusion at the present census under "miscellaneous" of the appropriations for the improvement of the Columbia, Snake, and Willamette rivers, while at the earlier census they were credited to Oregon. This change in the arrangement from the census of 1890 was found necessary because of the impossibility of properly segregating the appropriations for the Willamette and Snake rivers from those for the Columbia river.

Columbia river.—The Columbia river is the largest stream emptying into the Pacific ocean from the United States. In the lower 330 miles of its course it forms the boundary between Oregon and Washington. For the improvement of this river and its tributaries, the Willamette and the Snake rivers, Congress has already appropriated more than \$13,000,000, or over one-third the total shown for all the rivers and harbors of the Pacific coast. In order to overcome the falls and rapids between The Dalles and Celilo falls, about 225 miles above the mouth of the Columbia river, Congress has authorized the construction of a continuous canal, about 8.5 miles long, from Celilo falls to Big Eddy. The canal will be 65 feet wide on the bottom and 8 feet deep, and the locks 300 feet long, with a clear width of 45 feet. The estimated cost is about \$4,000,000, of which \$885,000 has already been appropriated. For a more detailed description of these rivers and the contemplated improvements thereon reference is made to the section of this report on canals and other inland waters.

Lakes Union and Washington.—The connecting of Lakes Union and Washington with Puget Sound by means of a canal has been receiving Congressional attention since 1890. The two lakes are bodies of fresh water in the immediate vicinity of Seattle, Lake Union being entirely within the city limits. Several projects have been contemplated, but up to the present time no plan has been finally adopted, although some exca-

vating has been done along the Shilshole bay route. The rivers and harbors act of March 2, 1907, directed a survey and estimate of cost of a waterway or canal with one lock of sufficient size to accommodate the largest commercial or naval vessels afloat; or, if deemed more advisable, of lesser dimensions. In view of the advantages to commerce should these lakes be connected with Puget Sound it is probable that a suitable canal will be constructed in the near future.

Willamette Falls canal.—The canal and locks were built during the years 1870-72 by the Willamette Falls Canal and Locks Company and were opened for traffic in 1873. They were sold on March 8, 1876, to the Willamette Transportation and Locks Company and again sold in 1892 to the Portland General Electric Company.

By the terms of the state legislative act, dated October 21, 1870, the state could have taken possession in 1893 on payment of their actual value, but unfortunately the option was allowed to lapse.

On March 3, 1899, a board of United States engineers were ordered to examine the locks and report on the desirability of their acquisition by the United States Government. It is from their report that this description is taken.

This board reported in favor of the acquisition, provided the works could be obtained for a reasonable sum. They reported also that they regarded \$1,200,000, the price demanded by the present owners, as excessive.

The locks and canal consist of a flight of four locks having a lift of about 10 feet each, a canal basin just above these about 1,250 feet long, and a guard lock 210 feet long connecting this basin with the upper level. An upper entrance about 1,000 feet long makes the total length of the canal, including the locks and entrance, about 3,500 feet.

The lower part of the canal, including four locks, is roughly cut in the solid rock, and wooden fenders are placed at intervals to protect the sides of the vessels passing through the canal.

There is a low dam along the crest of the natural fall, in order to secure an even crest and to raise the water surface probably not over 18 inches or 2 feet.

The following statement shows the results of its operation:

YEAR.	Freight (tons).	Receipts.	Expendi- tures.	Net earn- ings.
1898.....	36,569	\$33,880	\$5,377	\$28,503
1897.....	30,000	32,480	5,749	26,731
1896.....	36,512	25,366	4,153	21,210
1895.....	25,488	28,518	4,355	24,163
1894.....	29,637	27,530	3,448	24,082
1893.....	26,288	.....	.....	.....
1892.....	24,338	.....	.....	.....
1891.....	30,753	.....	.....	.....
1890.....	29,687	.....	.....	.....
1889.....	37,559	.....	.....	.....
1888.....	38,707	.....	.....	.....
1887.....	22,590	.....	.....	.....
1886.....	21,620	.....	.....	.....
1885.....	36,511	.....	.....	.....
1884.....	24,603	.....	.....	.....
1883.....	29,281	.....	.....	.....
1882.....	13,614	.....	.....	.....

The works are in bad repair and little is being done to improve them. The water in the canal is used for manufacturing purposes to such an extent as to seriously interfere with the usefulness of the canal to navigation. As a waterway this canal leaves much to be desired.

The toll charged during the operation of the canal was at the rate of 50 cents per ton.

The Cascades canal.—Where the Columbia river passes through the Cascade range there is a narrow gorge, in which occur the rapids known as the Cascades of the Columbia. To get around these rapids is the purpose of the canal. The original project for a canal and locks at an estimated cost of \$2,544,545, adopted in 1877, was modified in 1888 to include the improvement of the channel below the falls so as to insure an 8-foot channel at all stages, with a lock 462 feet long and 92 feet wide. This project was again modified in 1894 so as to provide for a second lock above the upper lock gates.

The works were partially completed and were opened to navigation in the fall of 1896.

Counting the estimated amount necessary to complete this work, the total cost will be \$4,007,260.

The maximum draft that can safely pass the locks is about 7 feet. No tolls are charged.

Statement of operations.

YEAR.	Freight (tons).	YEAR.	Freight (tons).
1903.....	33,173	1899.....	17,710
1902.....	38,501	1898.....	16,700
1901.....	19,710	1897.....	18,812
1900.....	22,426		

Yamhill river.—The Yamhill river rises in the Coast range and joins the Willamette about 40 miles above its mouth.

In 1896 the construction of a lock and dam was authorized to provide 3½-foot navigation from its junction with the Willamette to McMinnville.

On this work \$247,747 was expended up to June, 1903. No tolls are charged.

Statement of operations.

YEAR.	Freight (tons).	YEAR.	Freight (tons).
1904.....	3,394	1902.....	1,747
1903.....	800	1901.....	2,455

TRANSPORTATION BY WATER.

TABLE 27.—ALL VESSELS, BY CLASS.

CLASS, OCCUPATION, AND OWNERSHIP.		Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate.....	2,537	977,687	770,376	837	38	191	.....	435,020	10,697	.....
2	Steam.....	1,066	518,107	349,403	837	38	191	.....	435,020	10,697	.....
3	Freight and passenger.....	604	451,270	301,336	455	5	144	.....	355,849	6,333	.....
4	Tugs and other towing vessels.....	313	24,151	15,290	272	2	39	.....	47,764	2,520	.....
5	Ferryboats.....	47	40,171	31,018	10	31	6	.....	29,079	86	.....
6	Yachts.....	66	1,065	764	66	.....	.....	.....	810	1,237	.....
7	All other.....	36	1,450	995	34	.....	2	.....	1,518	521	.....
8	Individual.....	320	23,015	15,906	297	2	21	.....	20,082	5,286	.....
9	Freight and passenger.....	149	19,649	13,766	132	.....	17	.....	16,322	2,390	.....
10	Tugs and other towing vessels.....	93	1,775	1,053	90	1	2	.....	2,772	1,467	.....
11	Ferryboats.....	5	507	300	2	1	2	.....	320	71	.....
12	Yachts.....	57	934	677	57	.....	.....	.....	660	1,057	.....
13	All other.....	16	150	110	16	.....	.....	.....	8	301	.....
14	Firm.....	121	14,084	9,540	98	1	22	.....	14,195	1,415	.....
15	Freight and passenger.....	71	12,326	8,404	52	.....	19	.....	10,804	863	.....
16	Tugs and other towing vessels.....	39	1,550	996	36	.....	3	.....	3,136	419	.....
17	Ferryboats.....	2	27	21	1	1	.....	.....	30	15	.....
18	Yachts.....	5	55	38	5	.....	.....	.....	.....	92	.....
19	All other.....	4	126	81	4	.....	.....	.....	225	26	.....
20	Incorporated company.....	609	477,815	321,586	434	32	143	.....	396,249	3,901	.....
21	Freight and passenger.....	384	419,295	279,166	271	5	108	.....	328,723	3,080	.....
22	Tugs and other towing vessels.....	172	18,814	11,762	142	1	29	.....	38,517	559	.....
23	Ferryboats.....	37	38,780	30,927	7	26	4	.....	28,324	.....	.....
24	Yachts.....	4	76	49	4	.....	.....	.....	150	88	.....
25	All other.....	12	850	582	10	.....	2	.....	535	174	.....
26	Miscellaneous.....	16	3,193	2,371	8	3	5	.....	4,494	95	.....
27	Freight and passenger.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Tugs and other towing vessels.....	9	2,012	1,479	4	.....	5	.....	3,339	75	.....
29	Ferryboats.....	3	857	670	.....	3	.....	.....	405	.....	.....
30	Yachts.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	All other.....	4	324	222	4	.....	.....	.....	750	20	.....
32	Sail.....	666	305,283	277,295	.....	.....	.....	.....	.....	.....	.....
33	Freight and passenger.....	547	302,798	275,060	.....	.....	.....	.....	.....	.....	.....
34	Yachts.....	104	1,459	1,238	.....	.....	.....	.....	.....	.....	.....
35	All other.....	15	1,026	937	.....	.....	.....	.....	.....	.....	.....
36	Individual.....	366	85,227	78,940	.....	.....	.....	.....	.....	.....	.....
37	Freight and passenger.....	273	83,561	75,426	.....	.....	.....	.....	.....	.....	.....
38	Yachts.....	85	1,140	1,020	.....	.....	.....	.....	.....	.....	.....
39	All other.....	8	526	494	.....	.....	.....	.....	.....	.....	.....
40	Firm.....	99	51,721	47,054	.....	.....	.....	.....	.....	.....	.....
41	Freight and passenger.....	80	51,336	46,707	.....	.....	.....	.....	.....	.....	.....
42	Yachts.....	17	273	241	.....	.....	.....	.....	.....	.....	.....
43	All other.....	2	112	106	.....	.....	.....	.....	.....	.....	.....
44	Incorporated company.....	187	159,756	145,542	.....	.....	.....	.....	.....	.....	.....
45	Freight and passenger.....	188	159,745	145,535	.....	.....	.....	.....	.....	.....	.....
46	Yachts.....	1	11	7	.....	.....	.....	.....	.....	.....	.....
47	All other.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
48	Miscellaneous.....	14	8,579	7,759	.....	.....	.....	.....	.....	.....	.....
49	Freight and passenger.....	8	8,156	7,392	.....	.....	.....	.....	.....	.....	.....
50	Yachts.....	1	35	30	.....	.....	.....	.....	.....	.....	.....
51	All other.....	5	388	337	.....	.....	.....	.....	.....	.....	.....
52	Unrigged.....	806	154,297	143,678	.....	.....	.....	.....	.....	.....	.....
53	Individual.....	120	11,323	9,930	.....	.....	.....	.....	.....	.....	.....
54	Firm.....	55	7,326	6,919	.....	.....	.....	.....	.....	.....	.....
55	Incorporated company.....	608	132,833	124,176	.....	.....	.....	.....	.....	.....	.....
56	Miscellaneous.....	22	2,815	2,653	.....	.....	.....	.....	.....	.....	.....

OCCUPATION, AND OWNERSHIP: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers.	All other.					
57	73	2,404	3	\$76,622,633	\$29,340,102	\$10,424,493	\$8,755,544	20,142	\$12,950,399	44,189,971	13,301,293	1
42	63	959	2	60,440,145	20,600,325	10,414,347	6,272,798	14,423	9,330,294	44,187,184	6,685,007	2
37	49	517	1	52,164,977	20,065,562	8,365,559	1,260,954	11,978	7,281,028	4,631,500	6,673,310	3
4	10	290		3,353,927	534,463	10,208	2,761,267	1,548	1,245,085	22,580	11,637	4
	2	44	1	4,315,522		2,037,580	2,170,850	759	708,777	39,532,354		5
	1	65		294,800			2,500	60	33,271			6
	1	34		310,019	300	1,000	77,227	72	59,133	750	60	7
1	2	317		2,012,260	1,318,860	320,117	375,360	1,236	822,125	915,002	614,734	8
1	1	147		2,304,030	1,296,292	296,817	81,413	921	628,382	774,599	606,885	9
		93		368,600	22,268	6,064	259,364	225	145,465	17,080	7,789	10
	1	56		22,300		16,236	13,370	16	11,268	122,573		11
		16		243,300		1,000	21,213	56	27,225	750	0	12
		16		34,030	300			18	9,785			13
1	1	119		1,599,400	885,182	178,902	240,839	698	510,006	545,008	419,673	14
	1	70		1,327,550	876,717	172,580	14,738	528	386,727	449,560	419,313	15
		39		223,350	8,465	2,895	214,248	155	111,554	3,500	369	16
		2		3,500		3,427	1,849	3	2,800	91,939		17
		5		14,500			2,500	4	1,420			18
1		3		30,500			7,504	8	7,505			19
40	60	507	2	55,560,485	18,306,283	9,915,328	5,532,867	12,377	7,911,038	41,571,174	5,650,600	20
36	47	300	1	48,533,397	17,892,553	7,896,162	1,164,803	10,529	6,265,919	3,407,332	5,647,112	21
4	10	158		2,642,977	503,730	1,249	2,165,923	1,101	949,087	2,000	3,488	22
	2	34	1	4,254,722		2,017,917	2,155,631	715	699,809	38,161,842		23
		4		37,000				6	4,626			24
	1	11		92,389			46,510	26	21,597			25
		16		368,000			123,732	112	87,125	1,156,000		26
		9		179,000			121,732	67	41,979			27
		3		35,000				25	24,900	1,156,000		28
		4		154,000			2,000	20	20,246			29
12	8	645	1	11,533,171	8,090,122	10,146	199,483	4,451	2,710,571	2,787	3,437,372	32
12	8	527		11,275,586	8,090,007	10,146	177,626	4,401	2,683,528	2,787	3,437,197	33
		104		174,110			100	28	11,890			34
		14	1	83,475	115		21,757	52	24,153		175	35
		366		3,455,600	2,686,972	1,145	72,158	1,636	964,470	2,550	1,053,828	36
		273		3,268,725	2,686,857	1,145	50,301	1,588	945,397	2,550	1,053,653	37
		85		145,400			100	23	9,570			38
		8		41,475	115		21,757	25	9,503		175	39
1	1	97		1,934,565	1,318,831	300	14,399	748	496,254	4	377,644	40
1	1	78		1,897,655	1,318,831	300	14,399	738	490,874	4	377,644	41
		17		22,910				5	2,320			42
		2		14,000				5	3,060			43
11	7	189		5,866,206	4,024,889	8,701	100,470	1,978	1,192,927	233	1,950,015	44
11	7	168		5,861,206	4,024,889	8,701	100,470	1,978	1,192,927	233	1,950,015	45
		1		5,000								46
												47
		13	1	276,800	159,430		12,456	119	65,920		55,885	48
		8		248,000	159,430		12,456	97	54,330		55,885	49
		1		800								50
		4	1	28,000				22	11,590			51
3	2	800		4,649,317	649,655		2,283,263	1,238	900,534		3,178,914	52
		120		217,405	61,030		188,055	150	89,730		195,113	53
		55		144,360	21,845		131,055	58	40,183		200,805	54
3	2	603		3,808,324	566,780		1,751,902	878	661,612		2,782,996	55
		22		479,228			212,251	152	109,069			56